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THIRTY-FOURTH ANNUAL REPORT
OF THE
HEALTH DEPARTMENT



OF THE
CITY OF BOSTON
1905



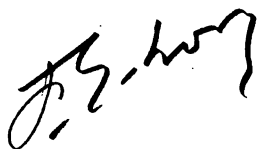
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THIRTY-FOURTH ANNUAL REPORT



OF THE

HEALTH DEPARTMENT

OF THE

CITY OF BOSTON

FOR THE YEAR 1905



BOSTON
MUNICIPAL PRINTING OFFICE
1906

ORGANIZATION OF THE HEALTH DEPARTMENT.

SAMUEL H. DURGIN, M.D., *Chairman.*

DENNIS J. HERN.

THOMAS B. SHEA, M.D.

CHARLES E. DAVIS, JR., *Secretary.*

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BOSTON, February 1, 1906.

HON. JOHN F. FITZGERALD,

Mayor of the City of Boston:

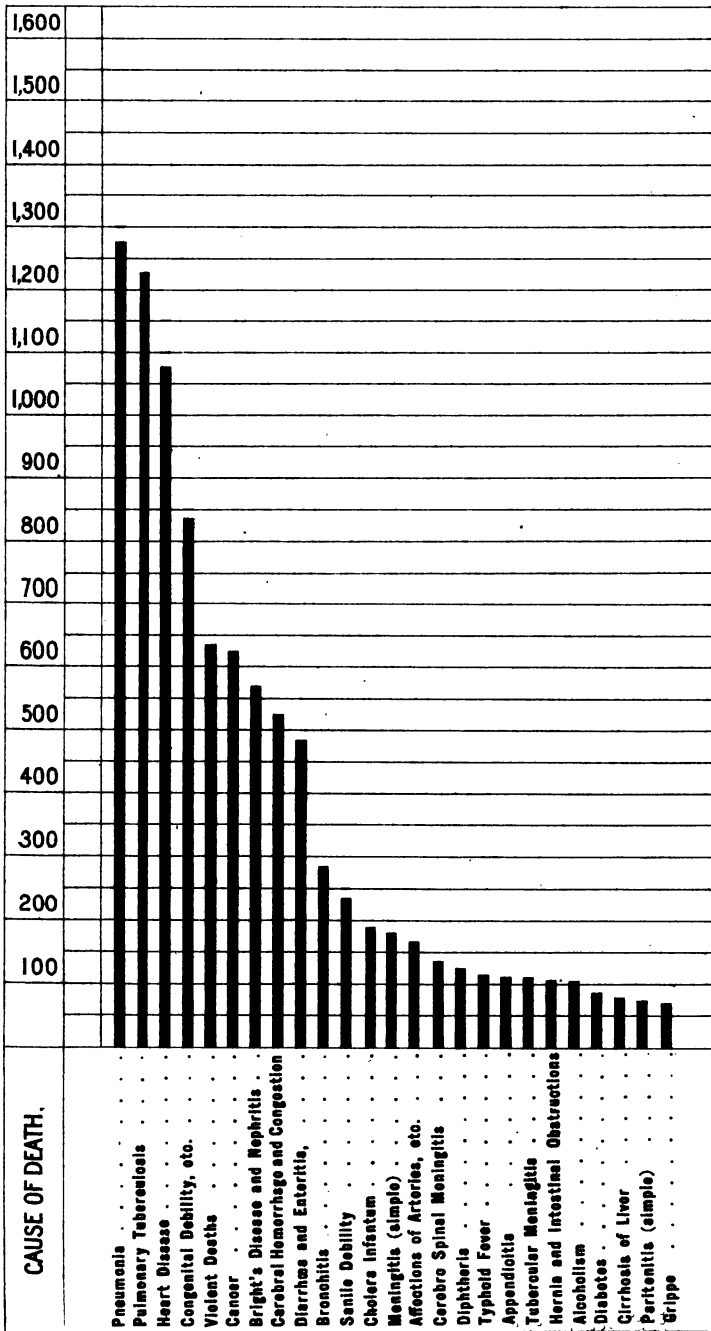
SIR, — The Board of Health respectfully presents the thirty-fourth annual report of the department, covering its operations for the financial year ending January 31, 1906, and the mortality statistics for the calendar year ending December 31, 1905. The general health of the city for the past year, so far as it may be judged by the total mortality and its classified causes, compares favorably with preceding years.

The total number of deaths for the year was 11,007, an increase over the previous year of 250 deaths. The census population, in the middle of the year, is 595,380. The death-rate for the year, as calculated on this population, is 18.49 per 1,000 inhabitants. This rate was greater by 0.21 than that of the previous year, but lower by 1.78 than the average of the previous ten years. There were 2,161 deaths from infectious diseases, including consumption, a decrease of 150 deaths. There were 74 less deaths from diphtheria and croup than in 1904, and a proportionate decrease in the number of cases. The percentage of deaths to the number of cases of diphtheria reported was 8.52, as against 8.12 per cent. the preceding year. There were 44 deaths from scarlatina, 5 more deaths than in the preceding year, and 62 deaths less than the average for the ten previous years. Typhoid fever caused 117 deaths during the year, 18 less deaths than the preceding year. Fifty-eight of the deaths from this cause occurred during the months of August, September and October, and 66 of the whole number died between the ages of twenty and forty years.

There were 54 deaths from measles during the year. The number of deaths of children under five years of age was 3,024, compared with 3,105 for the previous year, showing a decrease of 81 deaths. The respiratory diseases caused fully 25 per cent. of the mortality for the past year.

CHART NO. 1.

Comparative View of Twenty-five of the Principal Causes of Death during the Year 1905.

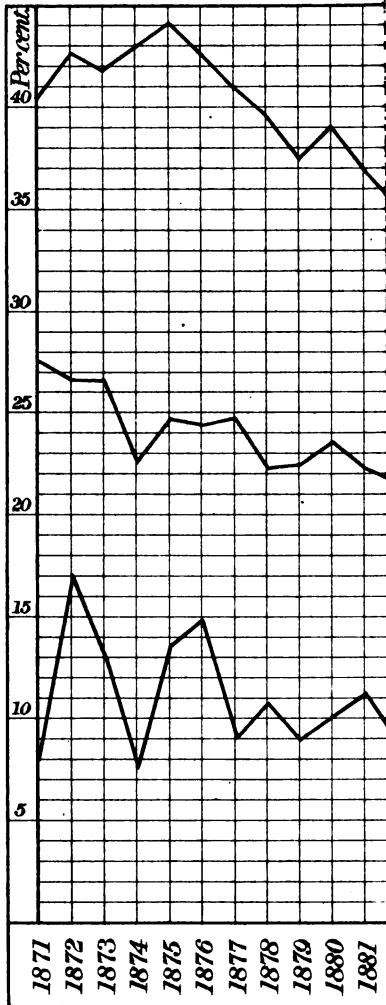


■ Deaths from Infectious Diseases.

■ Deaths from other Diseases.

1700

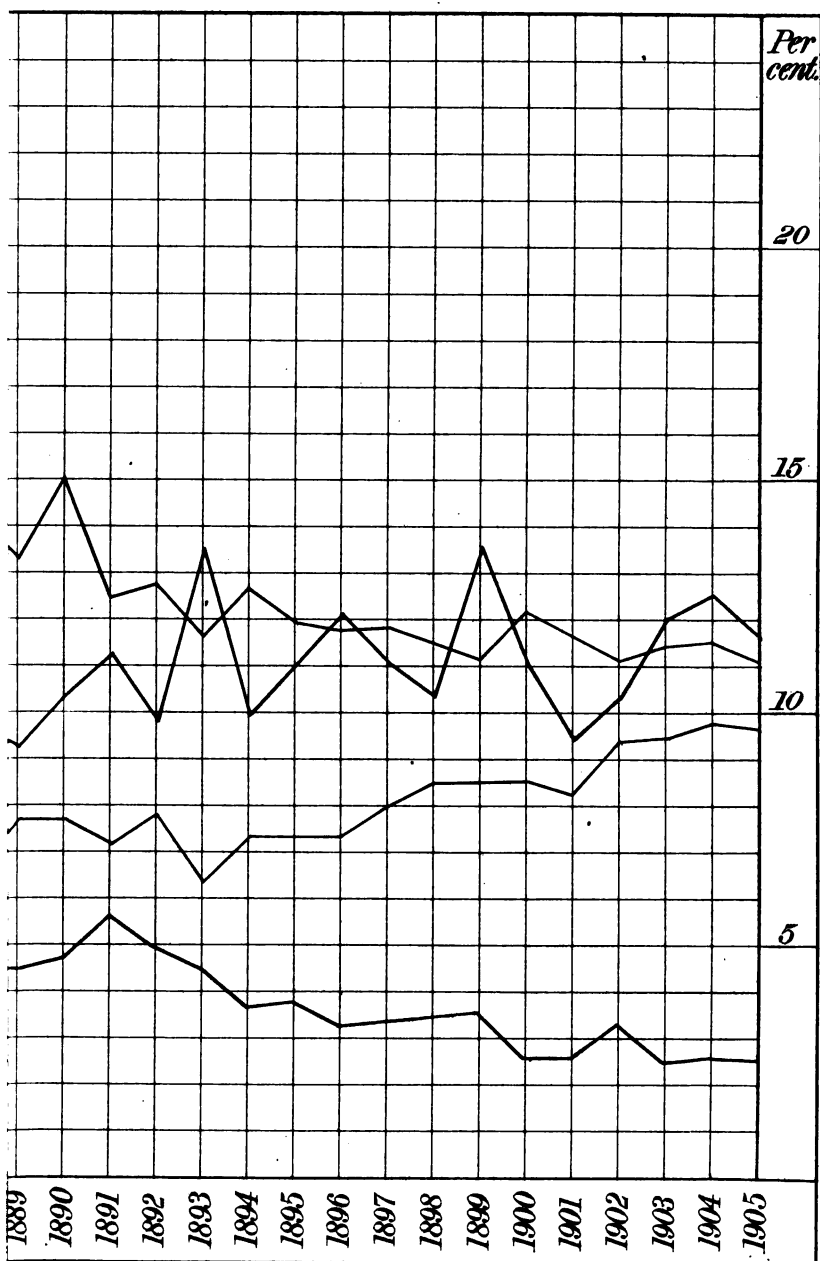
Percentage
UNDER ONE YEAR
to the total



Percentage of Chi
" of Chi
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and

1889

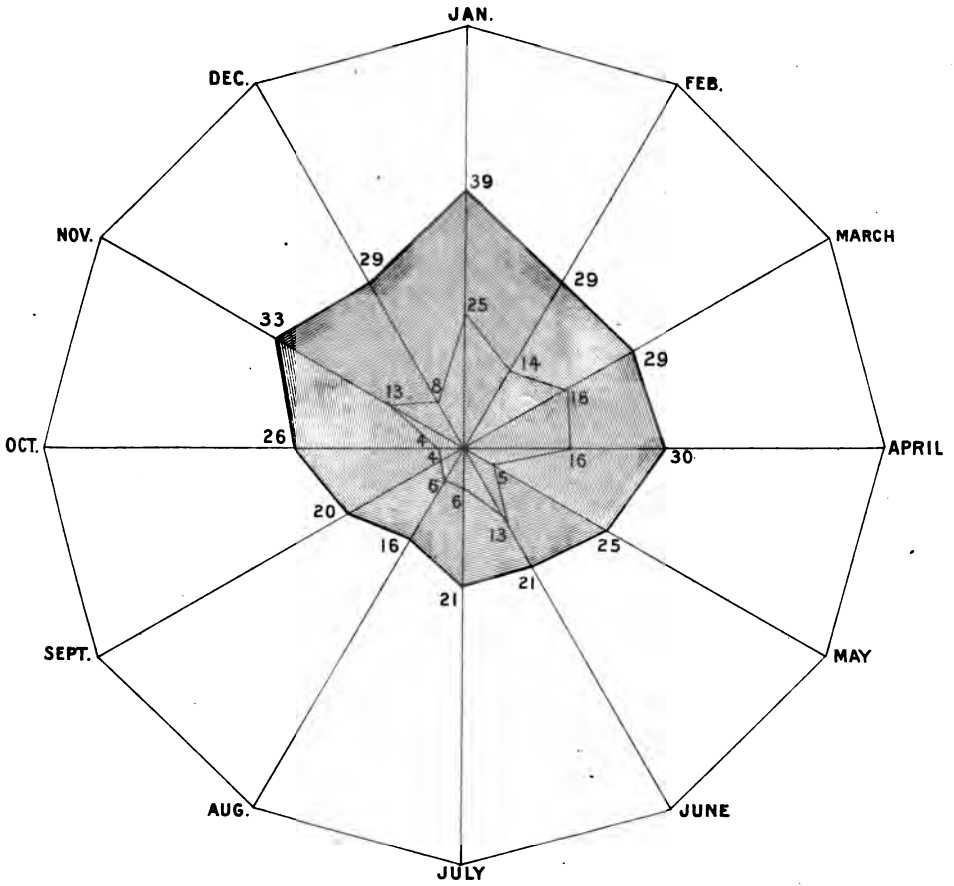
FOR FIFTY-FIVE YEARS.



BRONCHITIS ■

CHART NO. 4.

DIPHTHERIA.



———— Average deaths per month for ten years, 1896-1905.

———— Deaths per month for the year 1905.

Table I. — Total of Deaths, Still-births and Deaths from Infectious Diseases for Thirty-five Years.

| YEARS. | Total Deaths, Exclusive of Still-births. | Still births. | Rates of Still- births per 1,000 Inhabi- tants. | Diphtheria and Croup. | Scarlet Fever. | Typhoid Fever. | Cerebro-spinal Meningitis. | Whooping Cough. | Measles. | Smallpox. | Cholera Infantum. | Pyæmia and Septicæmia. | Erysipelas. | Intermittent Fever. | Dysentery. |
|-----------|--|------------------|--|--------------------------|-------------------|-------------------|-------------------------------|--------------------|----------|-----------|----------------------|---------------------------|-------------|------------------------|------------|
| 1871..... | 5,888 | 543 | 1.88 | 128 | 111 | 176 | 3 | 30 | 9 | 23 | 526 | .... | 59 | .... | 56 |
| 1872..... | 8,090 | 560 | 1.91 | 94 | 258 | 229 | 60 | 52 | 60 | 738 | 742 | .... | 99 | .... | 56 |
| 1873..... | 7,869 | 515 | 1.76 | 119 | 474 | 243 | 216 | 33 | 16 | 392 | 616 | .... | 92 | 1 | 57 |
| 1874..... | 7,812 | 642 | 2.19 | 121 | 269 | 202 | 35 | 108 | 41 | 2 | 679 | 26 | 51 | 3 | 56 |
| 1875..... | 9,060 | 541 | 1.28 | 631 | 534 | 227 | 41 | 41 | 65 | 1 | 684 | 22 | 69 | .... | 97 |
| 1876..... | 8,253 | 485 | 1.41 | 720 | 458 | 145 | 13 | 59 | 2 | 2 | 542 | 36 | 45 | .... | 96 |
| 1877..... | 7,316 | 471 | 1.37 | 471 | 104 | 156 | 24 | 88 | 2 | 4 | 563 | 18 | 30 | 4 | 166 |
| 1878..... | 7,686 | 441 | 1.28 | 569 | 68 | 120 | 19 | 88 | 145 | .... | 395 | 14 | 43 | 2 | 216 |
| 1879..... | 7,398 | 453 | 1.24 | 545 | 149 | 119 | 15 | 112 | 2 | .... | 383 | 29 | 46 | 4 | 101 |
| 1880..... | 8,581 | 443 | 1.22 | 774 | 33 | 154 | 8 | 94 | 49 | 1 | 518 | 18 | 24 | .... | 121 |
| 1881..... | 9,016 | 513 | 1.29 | 802 | 35 | 207 | 16 | 77 | 108 | 6 | 444 | 23 | 42 | 3 | 96 |
| 1882..... | 8,995 | 518 | 1.26 | 575 | 75 | 212 | 24 | 92 | 25 | 8 | 506 | 33 | 40 | 2 | 83 |
| 1883..... | 9,740 | 504 | 1.17 | 608 | 211 | 198 | 23 | 31 | 152 | 1 | 543 | 42 | 42 | 1 | 88 |
| 1884..... | 9,622 | 503 | 1.17 | 487 | 209 | 216 | 28 | 181 | 13 | 1 | 517 | 40 | 47 | 1 | 61 |
| 1885..... | 9,618 | 520 | 1.30 | 450 | 156 | 152 | 19 | 26 | 84 | 2 | 461 | 32 | 40 | 3 | 62 |
| 1886..... | 9,268 | 543 | 1.35 | 423 | 81 | 135 | 14 | 37 | 36 | .... | 444 | 43 | 39 | .... | 61 |
| 1887..... | 10,073 | 534 | 1.33 | 410 | 195 | 188 | 16 | 82 | 119 | .... | 492 | 37 | 34 | .... | 59 |
| 1888..... | 10,179 | 552 | 1.33 | 589 | 65 | 170 | 19 | 74 | 27 | 2 | 440 | 27 | 41 | 1 | 48 |
| 1889..... | 10,259 | 598 | 1.42 | 683 | 23 | 186 | 21 | 96 | 48 | 2 | 450 | 26 | 24 | .... | 76 |
| 1890..... | 10,181 | 627 | 1.39 | 462 | 42 | 155 | 17 | 39 | 19 | .... | 498 | 31 | 36 | .... | 30 |
| 1891..... | 10,571 | 614 | 1.33 | 285 | 64 | 154 | 21 | 39 | 21 | .... | 597 | 44 | 39 | 2 | 48 |
| 1892..... | 11,236 | 633 | 1.34 | 481 | 262 | 137 | 12 | 45 | 19 | .... | 563 | 37 | 37 | .... | 30 |
| 1893..... | 11,710 | 605 | 1.24 | 546 | 248 | 148 | 15 | 40 | 27 | .... | 499 | 56 | 56 | 6 | 39 |
| 1894..... | 11,520 | 700 | 1.39 | 878 | 192 | 141 | 18 | 111 | 8 | 22 | 589 | 53 | 32 | 4 | 38 |
| 1895..... | 11,329 | 607 | 1.21 | 654 | 114 | 163 | 15 | 47 | 19 | .... | 500 | 67 | 34 | 5 | 43 |
| 1896..... | 11,634 | 648 | 1.25 | 572 | 112 | 162 | 21 | 67 | 27 | .... | 575 | 61 | 30 | 5 | 44 |
| 1897..... | 11,154 | 614 | 1.16 | 456 | 136 | 173 | 185 | 39 | 21 | .... | 400 | 73 | 34 | 1 | 18 |
| 1898..... | 10,886 | 613 | 1.13 | 185 | 33 | 185 | 97 | 68 | 27 | .... | 441 | 69 | 30 | 1 | 41 |
| 1899..... | 11,167 | 539 | .97 | 304 | 74 | 165 | 88 | 76 | 33 | 5 | 280 | 73 | 42 | 1 | 31 |
| 1900..... | 11,678 | 573 | 1.02 | 537 | 181 | 143 | 66 | 99 | 89 | .... | 299 | 100 | 53 | 6 | 26 |
| 1901..... | 11,300 | 576 | 1.01 | 353 | 210 | 142 | 54 | 65 | 103 | 74 | 210 | 98 | 51 | 1 | 28 |
| 1902..... | 10,983 | 623 | 1.08 | 225 | 87 | 139 | 62 | 132 | 66 | 190 | 188 | 89 | 65 | 8 | 36 |
| 1903..... | 10,632 | 633 | 1.09 | 214 | 65 | 119 | 47 | 108 | 50 | 13 | 180 | 66 | 34 | .... | 22 |
| 1904..... | 10,757 | 663 | 1.13 | 206 | 39 | 135 | 37 | 29 | 89 | .... | 206 | 77 | 62 | 2 | 20 |
| 1905..... | 11,007 | 670 | 1.13 | 132 | 44 | 117 | 142 | 29 | 54 | 1 | 182 | 61 | 47 | 2 | 15 |

Table II.—Total number of Deaths under One Year; under Five Years, Five Years and Over, with Percentages to the Total Mortality for Thirty-five Years. Also Death Rates under One Year per Ten Thousand Inhabitants.

| YEARS. | Total Deaths. | Five Years and over. | Under Five Years. | Under One Year. | PERCENTAGES. | | | Death Rate under One Year per 10,000 Inhabitants. |
|-----------|---------------|----------------------|-------------------|-----------------|----------------------|-------------------|-----------------|---|
| | | | | | Five Years and over. | Under Five Years. | Under One Year. | |
| 1871..... | 5,888 | 3,493 | 2,395 | 1,597 | 59.33 | 40.67 | 27.12 | 61.89 |
| 1872..... | 8,090 | 4,676 | 3,414 | 2,157 | 57.79 | 42.21 | 26.66 | 81.16 |
| 1873..... | 7,869 | 4,580 | 3,249 | 2,066 | 58.20 | 41.80 | 26.25 | 64.32 |
| 1874..... | 7,812 | 4,454 | 3,258 | 2,202 | 57.01 | 42.99 | 22.19 | 66.45 |
| 1875..... | 9,060 | 5,088 | 3,972 | 2,263 | 56.16 | 43.84 | 24.98 | 66.18 |
| 1876..... | 8,253 | 4,722 | 3,531 | 2,086 | 57.22 | 42.78 | 24.67 | 58.84 |
| 1877..... | 7,316 | 4,334 | 2,982 | 1,817 | 59.24 | 40.76 | 24.84 | 51.60 |
| 1878..... | 7,636 | 4,630 | 3,006 | 1,747 | 60.63 | 39.37 | 22.88 | 49.30 |
| 1879..... | 7,398 | 4,598 | 2,805 | 1,690 | 62.08 | 37.92 | 22.84 | 47.13 |
| 1880..... | 8,531 | 5,182 | 3,349 | 2,014 | 60.74 | 39.26 | 23.60 | 55.50 |
| 1881..... | 9,016 | 5,702 | 3,314 | 2,006 | 63.24 | 36.76 | 22.24 | 54.46 |
| 1882..... | 8,995 | 5,844 | 3,151 | 1,945 | 64.97 | 35.03 | 21.62 | 52.05 |
| 1883..... | 9,740 | 6,113 | 3,672 | 2,183 | 62.76 | 37.24 | 22.41 | 57.58 |
| 1884..... | 9,622 | 6,052 | 3,570 | 2,235 | 62.90 | 37.10 | 23.23 | 58.09 |
| 1885..... | 9,618 | 6,152 | 3,466 | 2,156 | 63.97 | 36.03 | 22.42 | 53.23 |
| 1886..... | 9,268 | 6,082 | 3,186 | 2,110 | 55.63 | 34.37 | 22.77 | 52.57 |
| 1887..... | 10,073 | 6,411 | 3,662 | 2,312 | 63.55 | 36.35 | 22.95 | 56.02 |
| 1888..... | 10,197 | 6,598 | 3,599 | 2,281 | 64.71 | 35.29 | 22.37 | 53.76 |
| 1889..... | 10,259 | 6,626 | 3,633 | 2,360 | 64.59 | 35.41 | 23.06 | 54.10 |
| 1890..... | 10,181 | 6,832 | 3,349 | 2,271 | 67.11 | 32.89 | 22.30 | 51.08 |
| 1891..... | 10,571 | 6,963 | 3,608 | 2,552 | 65.87 | 34.13 | 24.14 | 55.75 |
| 1892..... | 11,236 | 7,501 | 3,735 | 2,466 | 66.76 | 33.24 | 21.95 | 52.78 |
| 1893..... | 11,710 | 7,723 | 3,987 | 2,531 | 65.96 | 34.04 | 21.61 | 53.07 |
| 1894..... | 11,520 | 7,412 | 4,108 | 2,552 | 64.34 | 35.66 | 22.15 | 52.42 |
| 1895..... | 11,329 | 7,394 | 3,935 | 2,540 | 65.27 | 34.73 | 22.77 | 51.49 |
| 1896..... | 11,634 | 7,579 | 4,055 | 2,670 | 65.15 | 34.85 | 22.95 | 51.71 |
| 1897..... | 11,154 | 7,446 | 3,708 | 2,462 | 66.76 | 33.24 | 22.07 | 46.55 |
| 1898..... | 10,886 | 7,309 | 3,577 | 2,572 | 67.14 | 32.86 | 23.63 | 47.47 |
| 1899..... | 11,167 | 7,576 | 3,591 | 2,404 | 67.84 | 32.16 | 21.53 | 48.41 |
| 1900..... | 11,678 | 7,926 | 3,752 | 2,410 | 67.87 | 32.13 | 20.64 | 42.96 |
| 1901..... | 11,300 | 7,831 | 3,469 | 2,287 | 69.30 | 30.70 | 20.24 | 40.29 |
| 1902..... | 10,983 | 7,616 | 3,367 | 2,257 | 69.34 | 30.66 | 20.55 | 39.29 |
| 1903..... | 10,632 | 7,553 | 3,079 | 2,173 | 71.04 | 28.96 | 20.44 | 37.88 |
| 1904..... | 10,757 | 7,652 | 3,105 | 2,207 | 71.13 | 28.87 | 20.52 | 37.51 |
| 1905..... | 11,007 | 7,983 | 3,024 | 2,186 | 72.53 | 27.47 | 19.86 | 36.72 |

Table III.—Deaths during the Year 1905, by Sex, Condition, Color, Nativity, Parentage and Season.

| | January. | February. | March. | April. | May. | June. | July. | August. | September. | October. | November. | December. | Total. |
|-----------------------------|----------|-----------|--------|--------|-------|-------|-------|---------|------------|----------|-----------|-----------|--------|
| Total number of deaths..... | 1,004 | 911 | 992 | 946 | 934 | 797 | 1,008 | 977 | 836 | 837 | 852 | 913 | 11,007 |
| <i>Sex :</i> | | | | | | | | | | | | | |
| Males..... | 509 | 489 | 506 | 491 | 494 | 421 | 561 | 537 | 436 | 442 | 436 | 517 | 5,839 |
| Females..... | 495 | 422 | 486 | 455 | 440 | 376 | 447 | 440 | 400 | 395 | 416 | 396 | 5,168 |
| <i>Condition :</i> | | | | | | | | | | | | | |
| Single..... | 449 | 386 | 442 | 427 | 442 | 394 | 563 | 586 | 452 | 411 | 411 | 448 | 5,409 |
| Married..... | 348 | 324 | 331 | 337 | 299 | 250 | 280 | 252 | 254 | 276 | 259 | 283 | 3,403 |
| Widows..... | 149 | 124 | 143 | 104 | 115 | 93 | 98 | 87 | 81 | 85 | 116 | 118 | 1,313 |
| Widowers..... | 47 | 59 | 67 | 52 | 64 | 45 | 53 | 39 | 42 | 47 | 55 | 47 | 617 |
| Divorced..... | 5 | 5 | 1 | 4 | 4 | 4 | 3 | 2 | 1 | 4 | 5 | 1 | 30 |
| Unknown..... | 6 | 13 | 8 | 22 | 10 | 11 | 11 | 13 | 6 | 14 | 6 | 16 | 136 |
| <i>Color :</i> | | | | | | | | | | | | | |
| White..... | 975 | 879 | 967 | 927 | 906 | 782 | 979 | 964 | 815 | 821 | 832 | 889 | 10,736 |
| Black (Negro or Mixed)... | 27 | 31 | 23 | 17 | 27 | 14 | 28 | 12 | 20 | 15 | 20 | 23 | 257 |
| Indian..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Chinese..... | 2 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | ..... | 1 | 14 |
| Japanese..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| <i>Nativity :</i> | | | | | | | | | | | | | |
| United States..... | 605 | 566 | 608 | 561 | 581 | 506 | 666 | 658 | 560 | 508 | 526 | 541 | 6,886 |
| Ireland..... | 201 | 178 | 188 | 177 | 163 | 140 | 182 | 144 | 145 | 147 | 159 | 191 | 2,015 |
| England..... | 29 | 12 | 24 | 17 | 22 | 16 | 18 | 14 | 21 | 31 | 28 | 11 | 243 |
| Scotland..... | 5 | 9 | 5 | 3 | 5 | 6 | 4 | 10 | 11 | 11 | 7 | 5 | 81 |
| Germany..... | 17 | 18 | 17 | 26 | 18 | 16 | 9 | 18 | 7 | 9 | 12 | 18 | 185 |
| British Provinces..... | 66 | 65 | 70 | 76 | 66 | 54 | 69 | 58 | 38 | 69 | 69 | 65 | 755 |
| Italy..... | 27 | 21 | 18 | 18 | 15 | 18 | 19 | 16 | 13 | 13 | 14 | 15 | 297 |
| Russia..... | 22 | 19 | 17 | 22 | 8 | 9 | 11 | 21 | 14 | 14 | 10 | 12 | 179 |
| Sweden..... | 6 | 6 | 4 | 6 | 9 | 3 | 6 | 11 | 4 | 3 | 4 | 12 | 74 |
| Other countries..... | 13 | 14 | 29 | 21 | 21 | 11 | 14 | 11 | 12 | 16 | 17 | 20 | 199 |
| Unknown..... | 13 | 13 | 12 | 19 | 26 | 18 | 10 | 16 | 11 | 16 | 6 | 23 | 183 |
| <i>Parentage :</i> | | | | | | | | | | | | | |
| American..... | 225 | 216 | 243 | 219 | 247 | 166 | 223 | 195 | 188 | 178 | 184 | 181 | 2,465 |
| Irish..... | 312 | 273 | 292 | 262 | 288 | 227 | 311 | 307 | 266 | 285 | 258 | 280 | 3,361 |
| English..... | 21 | 13 | 24 | 17 | 18 | 20 | 14 | 19 | 18 | 19 | 31 | 20 | 234 |
| Scotch..... | 8 | 12 | 8 | 13 | 8 | 8 | 6 | 12 | 11 | 14 | 11 | 5 | 116 |
| German..... | 20 | 25 | 21 | 31 | 18 | 14 | 15 | 22 | 19 | 16 | 17 | 25 | 243 |
| British Provinces..... | 58 | 58 | 60 | 61 | 64 | 45 | 69 | 59 | 33 | 51 | 65 | 56 | 679 |
| Italian..... | 55 | 38 | 39 | 43 | 37 | 40 | 48 | 63 | 47 | 32 | 60 | 66 | 568 |
| Russian..... | 38 | 32 | 29 | 36 | 22 | 24 | 29 | 42 | 36 | 33 | 22 | 39 | 382 |
| Swedish..... | 6 | 5 | 4 | 7 | 10 | 11 | 10 | 10 | 6 | 8 | 7 | 10 | 94 |
| Other countries..... | 58 | 54 | 74 | 52 | 49 | 45 | 62 | 51 | 57 | 48 | 36 | 49 | 635 |
| Mixed..... | 67 | 50 | 66 | 63 | 59 | 53 | 79 | 84 | 71 | 58 | 61 | 52 | 763 |
| One parent unknown..... | 40 | 55 | 63 | 48 | 37 | 70 | 59 | 56 | 36 | 33 | 28 | 40 | 565 |
| Unknown..... | 96 | 80 | 69 | 94 | 77 | 74 | 83 | 57 | 48 | 62 | 72 | 90 | 902 |

Table IV.—Monthly Deaths Reduced to a Standard of 100.

| MONTHS. 1905. | Total Deaths in Month. | Monthly Deaths Reduced to a Standard of 100. | Deaths per Day. |
|------------------|---------------------------|--|-----------------|
| January..... | 1,004 | 107.4 | 32.4 |
| February..... | 911 | 107.8 | 32.5 |
| March..... | 902 | 106.0 | 32.0 |
| April..... | 946 | 104.5 | 31.5 |
| May..... | 934 | 99.9 | 30.1 |
| June..... | 797 | 88.0 | 26.6 |
| July..... | 1,008 | 107.8 | 32.5 |
| August.... | 977 | 104.5 | 31.2 |
| September..... | 886 | 92.4 | 27.9 |
| October..... | 837 | 89.5 | 27.0 |
| November..... | 852 | 94.1 | 28.4 |
| December | 918 | 97.6 | 29.4 |
| Total..... | 11,007 | 100.0 | 30.2 |

Table V.—Deaths from Principal Infectious Diseases.

| | Total Deaths from each Cause. | Percentage of each Cause to Total Mortality. | Deaths per 1,000 In- habitants. | Total Deaths per Sex. | | Total Deaths per Sex under Five Years. | | Total Deaths under Five Years. | Percentage of each Cause under Five Years to Total Mortality. |
|---|----------------------------------|--|------------------------------------|-----------------------------|-------|--|-------|-----------------------------------|--|
| | | | | M. | F. | M. | F. | | |
| Smallpox | 1 | .009 | .002 | 1 | ..... | 1 | ..... | 1 | .009 |
| Measles..... | 54 | .490 | .090 | 29 | 25 | 28 | 23 | 51 | .463 |
| Scarlatina.... | 44 | .400 | .074 | 22 | 22 | 15 | 12 | 27 | .245 |
| Diphtheria and Croup... | 182 | 1.199 | .222 | 77 | 55 | 60 | 36 | 96 | .872 |
| Whooping-cough..... | 29 | .263 | .049 | 12 | 17 | 12 | 16 | 28 | .254 |
| Typhoid Fever..... | 117 | 1.063 | .196 | 74 | 43 | 2 | 4 | 6 | .054 |
| Erysipelas..... | 47 | .427 | .079 | 28 | 19 | 11 | 3 | 14 | .127 |
| Puerperal Septicæmia... | 26 | .236 | .044 | ..... | 26 | ..... | ..... | ..... | ..... |
| Dysentery..... | 15 | .136 | .025 | 8 | 7 | 1 | 1 | 2 | .018 |
| Cholera Morbus..... | 9 | .082 | .015 | 6 | 3 | 3 | 1 | 4 | .036 |
| Phthisis Laryngeal, Pul- monary and General Tuberculosis..... | 1,224 | 11.120 | 2.056 | 674 | 550 | 42 | 33 | 75 | .681 |
| Influenza..... | 73 | .663 | .123 | 28 | 45 | 2 | 7 | 9 | .082 |
| Syphilis, Congenital..... | 27 | .245 | .045 | 19 | 8 | 19 | 8 | 27 | .245 |
| Syphilis, Tertiary..... | 6 | .054 | .010 | 4 | 2 | | | | |
| Pyæmia and Septicæmia.. | 61 | .554 | .102 | 35 | 26 | 7 | 7 | 14 | .127 |

HEALTH DEPARTMENT.

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Table VI.—Yearly Percentages of Principal Infectious Diseases from 1879 to 1905, Inclusive, to Total Mortality.

| | 1879 | 1880 | 1881 | 1882 | 1883 | 1884 | 1885 | 1886 | 1887 | 1888 | 1889 | 1890 | 1891 | 1892 |
|---------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Smallpox..... | ..... | .011 | .066 | .068 | .010 | .010 | .020 | ..... | ..... | .019 | .019 | ..... | ..... | ..... |
| Measles..... | .027 | .574 | 1.197 | .377 | 1.560 | .135 | .873 | .388 | .181 | .264 | .468 | .186 | .188 | .169 |
| Scarlatina..... | 2.014 | .386 | .388 | .833 | 2.166 | 2.172 | 1.621 | .873 | 1.935 | .637 | .224 | .412 | .605 | 2.231 |
| Diphtheria..... | 5.285 | 6.892 | 6.465 | 5.091 | 4.568 | 3.585 | 3.472 | 3.519 | 3.137 | 4.609 | 5.498 | 3.938 | 2.194 | 3.684 |
| Croup..... | 2.061 | 2.180 | 2.229 | 1.300 | 1.673 | 1.475 | 1.299 | 1.014 | .933 | 1.167 | 1.160 | .599 | .501 | .586 |
| Whooping-cough..... | 1.513 | 1.101 | .364 | 1.022 | .318 | 1.981 | .370 | .399 | .314 | .725 | .986 | .383 | .368 | .400 |
| Typhoid fever..... | 1.608 | 1.804 | 2.226 | 2.366 | 2.082 | 2.245 | 1.590 | 1.456 | 1.316 | 1.667 | 1.813 | 1.522 | 1.456 | 1.219 |
| Erysipelas..... | .527 | .281 | .465 | .444 | .431 | .448 | .415 | .420 | .337 | .402 | .284 | .363 | 3.06 | .329 |
| Puerperal fever..... | .851 | .726 | .764 | .833 | .728 | .467 | .307 | .183 | .228 | .176 | .117 | .265 | .170 | .249 |
| Dysentery..... | 1.865 | 1.488 | 1.064 | .922 | .903 | .683 | .644 | .658 | .585 | .470 | .741 | .294 | .454 | .286 |
| Cholera morbus..... | .351 | .445 | .177 | .511 | .246 | .509 | .319 | .302 | .268 | .264 | .214 | .225 | .189 | .204 |
| Cholera infantum..... | 5.117 | 6.071 | 4.924 | 5.625 | 5.574 | 5.372 | 4.738 | 4.790 | 4.394 | 4.314 | 4.388 | 4.391 | 5.647 | 5.010 |
| Cerebro-spinal fever..... | .202 | .105 | .177 | .266 | .286 | .270 | .197 | .151 | .158 | .186 | .205 | .166 | .198 | .105 |
| Intermittent fever..... | .013 | .058 | .063 | .022 | .010 | .010 | .031 | ..... | ..... | .009 | ..... | ..... | .018 | ..... |
| Remittent fever..... | .061 | .082 | .044 | .011 | .010 | ..... | .020 | .053 | ..... | .109 | ..... | ..... | .009 | .008 |
| Pyæmia..... | .175 | .048 | .155 | .223 | .164 | .176 | .114 | .183 | .135 | .088 | .078 | .127 | .141 | .080 |
| Syphilis, congenital..... | .243 | .128 | .221 | .138 | .184 | .280 | .218 | .215 | .268 | .254 | .214 | .232 | .198 | .166 |
| Syphilis, tertiary..... | .094 | .068 | .068 | .100 | .183 | .061 | .503 | .075 | .079 | .089 | .097 | .029 | .047 | .028 |
| Septicæmia..... | .175 | .187 | .122 | .133 | .277 | .270 | .222 | .280 | .228 | .166 | .175 | .176 | .274 | .249 |
| Yellow fever..... | ..... | ..... | ..... | ..... | ..... | .010 | .010 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

Table VI. — Yearly Percentages of Principal Infectious Diseases from 1879 to 1905. — *Concluded.*

| | 1893 | 1894 | 1895 | 1896 | 1897 | 1898 | 1899 | 1900 | 1901 | 1902 | 1903 | 1904 | 1905 |
|---------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----------|-------|-------|
| Smallpox..... | .034 | .190 | ..... | ..... | ..... | ..... | .045 | ..... | .655 | 1.750 | .122 | ..... | .009 |
| Measles..... | .290 | .069 | .167 | .234 | .188 | .248 | .595 | .753 | .911 | .601 | .470 | .827 | .490 |
| Scarlatina..... | 2.118 | 1.666 | 1.006 | 1.040 | 1.219 | .803 | .662 | 1.549 | 1.855 | .792 | .611 | .362 | .400 |
| Diphtheria..... | 4.064 | 7.062 | 5.190 | 4.435 | 3.684 | 1.562 | 2.480 | 4.598 | 3.124 | 1.750 | { 2.013 } | | 1.199 |
| Croup..... | .597 | .529 | .582 | .481 | .403 | .138 | .242 | ..... | ..... | .319 | ..... | ..... | ..... |
| Whooping-cough..... | .841 | .963 | .414 | .576 | .319 | .625 | .630 | .848 | .575 | 1.202 | 1.016 | .270 | .263 |
| Typhoid fever..... | 1.263 | 1.223 | 1.438 | 1.392 | 1.551 | 1.689 | 1.477 | 1.224 | 1.257 | 1.265 | 1.119 | 1.225 | 1.063 |
| Erysipelas..... | .478 | .277 | .500 | .258 | .287 | .276 | .376 | .454 | .451 | .592 | .820 | .576 | .427 |
| Puerperal fever..... | .239 | .138 | .123 | .172 | .117 | .073 | .098 | .245 | .274 | .291 | .216 | .167 | .236 |
| Dysentery..... | .333 | .329 | .379 | .378 | .161 | .377 | .277 | .061 | .248 | .328 | .207 | .186 | .136 |
| Cholera morbus..... | .119 | .199 | .132 | .249 | .152 | .138 | .143 | .138 | .089 | .073 | .666 | .074 | .082 |
| Cholera infantum..... | 4.261 | 4.939 | 4.413 | 4.942 | 3.586 | 4.051 | 2.507 | 2.560 | 1.858 | 1.694 | 1.683 | 1.915 | 1.653 |
| Cerebro-spinal fever..... | .128 | .166 | .132 | .180 | 1.659 | .831 | .788 | .565 | .478 | .565 | .442 | .344 | 1.290 |
| Intermittent fever..... | .051 | .084 | .044 | .043 | .009 | .006 | .009 | .051 | .009 | .173 | ..... | .019 | .018 |
| Remittent fever..... | .017 | .180 | .008 | .009 | ..... | .009 | ..... | ..... | .590 | ..... | ..... | ..... | ..... |
| Pyæmia..... | .111 | .190 | .044 | .069 | .084 | .064 | .107 | ..... | ..... | .810 | .620 | .716 | ..... |
| Syphilis, congenital..... | .153 | .078 | .229 | .344 | .197 | .168 | .197 | .171 | .194 | .185 | .188 | .214 | .245 |
| Syphilis, tertiary..... | .068 | .062 | .070 | .051 | .080 | .083 | .045 | .085 | .115 | .091 | .122 | .121 | .054 |
| * Septicæmia..... | .367 | ..... | .547 | .456 | .600 | .569 | .546 | .856 | .867 | .810 | .621 | .716 | .554 |
| Yellow fever..... | ..... | ..... | ..... | ..... | .006 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

* Pyæmia included in 1905.

Table VII. — Deaths from Ten of the Principal Causes.

| | Total Deaths from each Cause. | Percentage of each Cause to Total Mortality. | Death per 1,000 Inhabitants. | Total Deaths by Sex. | | Total Deaths by Sex under five years. | | Total Deaths under Five Years. | Percentage of each Cause under Five Years to Total Mortality. |
|--|-------------------------------|--|------------------------------|----------------------|-----|---------------------------------------|-----|--------------------------------|---|
| | | | | M. | F. | M. | F. | | |
| Pneumonia..... | 1,274 | 11.575 | 2.140 | 675 | 599 | 243 | 209 | 452 | 4.106 |
| Pulmonary Laryngeal and General Tuberculosis..... | 1,224 | 11.120 | 2.066 | 674 | 550 | 42 | 33 | 75 | .681 |
| Heart Disease..... | 1,082 | 9.830 | 1.817 | 520 | 562 | 13 | 8 | 21 | .190 |
| Congenital Debility, Scleremia, etc..... | 759 | 6.896 | 1.275 | 441 | 318 | 441 | 318 | 759 | 6.896 |
| Diarrhœa, Enteritis, etc..... | 678 | 6.160 | 1.139 | 368 | 310 | 333 | 272 | 605 | 5.496 |
| Violent Deaths..... | 640 | 5.814 | 1.075 | 488 | 152 | 48 | 25 | 73 | .663 |
| Cancer and other malignant Tumors, Cerebral Hemorrhage and Congestion..... | 628 | 5.705 | 1.055 | 226 | 402 | 4 | 4 | 8 | .073 |
| Nephritis..... | 528 | 4.797 | .887 | 254 | 274 | 7 | 5 | 12 | .109 |
| Bronchitis..... | 373 | 3.389 | .628 | 202 | 171 | 6 | 2 | 8 | .073 |
| | 277 | 2.517 | .465 | 132 | 145 | 54 | 45 | 99 | .899 |

Table VIII. — Total Deaths each Quarter of the last Five Years, with the Aggregate and Average Number from 1896 to 1900, Inclusive.

| | 1901. | 1902. | 1903. | 1904. | 1905. | 5 years, 1896-1900. | |
|---------------------|--------|--------|--------|--------|--------|---------------------|----------|
| | | | | | | Aggregate. | Average. |
| First quarter..... | 3,082 | 2,868 | 2,982 | 2,963 | 2,907 | 14,873 | 2,975 |
| Second quarter..... | 2,744 | 2,645 | 2,515 | 2,598 | 2,677 | 13,531 | 2,706 |
| Third quarter..... | 2,814 | 2,647 | 2,594 | 2,625 | 2,821 | 14,909 | 2,982 |
| Fourth quarter..... | 2,710 | 2,823 | 2,541 | 2,571 | 2,602 | 13,206 | 2,641 |
| Total each year... | 11,300 | 10,983 | 10,632 | 10,757 | 11,007 | 56,519 | 11,304 |

Table IX. — Total Deaths and Percentages each Quarter for the Year 1905, with Aggregates and Percentages for the Ten Years Previous.

| | 1905. | | 1895-1904. | |
|---------------------|---------|-----------|------------|-----------|
| | Deaths. | Per cent. | Deaths. | Per cent. |
| First quarter..... | 2,907 | 26.41 | 29,713 | 26.64 |
| Second quarter..... | 2,677 | 24.32 | 26,607 | 23.86 |
| Third quarter..... | 2,821 | 25.63 | 28,616 | 25.66 |
| Fourth quarter..... | 2,602 | 23.64 | 26,584 | 23.84 |
| Total..... | 11,007 | 100.00 | 111,520 | 100.00 |

Table X.—The Number and Percentages of Deaths in each Quarter of each Year during a Period of Forty-One Years, 1865-1905, inclusive.

| YEARS. | FIRST QUARTER. | | SECOND QUARTER. | | THIRD QUARTER. | | FOURTH QUARTER. | | Rate Per 1,000 Inhabi- tants. ¹ |
|-----------|----------------|-----------|-----------------|-----------|----------------|-----------|-----------------|-----------|---|
| | Deaths. | Per cent. | Deaths. | Per cent. | Deaths. | Per cent. | Deaths. | Per cent. | |
| | | | | | | | | | |
| 1865..... | 1,115 | 24.55 | 1,068 | 23.52 | 1,353 | 29.80 | 1,005 | 22.13 | 23.61 |
| 1866..... | 999 | 22.81 | 967 | 21.86 | 1,338 | 30.56 | 1,085 | 24.78 | 22.51 |
| 1867..... | 1,071 | 24.22 | 960 | 21.49 | 1,191 | 26.94 | 1,209 | 27.35 | 23.38 |
| 1868..... | 1,341 | 24.30 | 1,303 | 21.80 | 1,736 | 31.45 | 1,239 | 22.45 | 23.89 |
| 1869..... | 1,374 | 24.88 | 1,297 | 23.48 | 1,562 | 28.28 | 1,290 | 28.36 | 23.54 |
| 1870..... | 1,336 | 22.88 | 1,314 | 21.55 | 1,983 | 32.53 | 1,406 | 23.05 | 24.34 |
| 1871..... | 1,411 | 23.97 | 1,299 | 22.06 | 1,842 | 31.28 | 1,366 | 23.69 | 22.82 |
| 1872..... | 1,697 | 20.97 | 1,777 | 21.97 | 2,511 | 31.04 | 2,105 | 26.03 | 30.43 |
| 1873..... | 2,115 | 26.88 | 1,726 | 21.38 | 2,278 | 28.95 | 1,750 | 23.24 | 28.75 |
| 1874..... | 1,805 | 23.11 | 1,818 | 23.27 | 2,278 | 29.16 | 1,911 | 24.46 | 23.57 |
| 1875..... | 2,190 | 24.17 | 2,011 | 22.20 | 2,680 | 29.58 | 2,179 | 24.05 | 26.50 |
| 1876..... | 2,246 | 27.21 | 1,809 | 21.92 | 2,375 | 28.78 | 1,923 | 22.09 | 29.96 |
| 1877..... | 1,723 | 23.55 | 1,613 | 22.05 | 2,317 | 31.67 | 1,668 | 22.73 | 29.89 |
| 1878..... | 1,743 | 22.82 | 1,744 | 22.84 | 2,174 | 28.47 | 1,975 | 25.87 | 31.55 |
| 1879..... | 1,947 | 26.32 | 1,615 | 21.68 | 1,959 | 26.48 | 1,877 | 25.37 | 29.63 |
| 1880..... | 2,015 | 23.63 | 1,829 | 21.45 | 2,500 | 29.30 | 2,187 | 25.63 | 23.51 |
| 1881..... | 2,332 | 25.86 | 2,021 | 22.42 | 2,466 | 27.35 | 2,197 | 24.38 | 24.48 |
| 1882..... | 2,104 | 23.39 | 2,312 | 24.59 | 2,439 | 27.67 | 2,190 | 24.35 | 24.07 |

| | | | | | | | | | |
|-----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1883..... | 2,398 | 23,39 | 2,409 | 24,74 | 2,757 | 28,31 | 2,906 | 28,67 | 29,69 |
| 1884..... | 2,294 | 23,73 | 2,103 | 21,85 | 2,725 | 28,33 | 2,510 | 26,09 | 26,01 |
| 1885..... | 2,510 | 26,10 | 2,484 | 25,83 | 2,692 | 26,95 | 2,083 | 21,13 | 24,64 |
| 1886..... | 2,214 | 23,89 | 2,113 | 22,79 | 2,680 | 27,84 | 2,361 | 25,48 | 28,09 |
| 1887..... | 2,363 | 23,45 | 2,381 | 23,65 | 2,912 | 28,90 | 2,518 | 25,00 | 21,41 |
| 1888..... | 2,790 | 27,36 | 2,430 | 23,73 | 2,649 | 25,98 | 2,388 | 22,93 | 24,03 |
| 1889..... | 2,437 | 23,75 | 2,543 | 24,79 | 2,364 | 27,83 | 2,425 | 23,64 | 23,52 |
| 1890..... | 2,911 | 28,60 | 2,244 | 22,04 | 2,699 | 26,51 | 2,337 | 22,85 | 22,70 |
| 1891..... | 2,443 | 23,10 | 2,540 | 24,03 | 2,835 | 26,82 | 2,764 | 26,05 | 23,09 |
| 1892..... | 2,998 | 26,68 | 2,582 | 22,96 | 2,968 | 26,33 | 2,698 | 24,01 | 24,04 |
| 1893..... | 2,969 | 25,35 | 2,847 | 24,31 | 3,013 | 28,74 | 2,831 | 24,60 | 24,55 |
| 1894..... | 2,972 | 25,80 | 2,592 | 22,60 | 3,182 | 27,62 | 2,774 | 24,08 | 23,66 |
| 1895..... | 2,945 | 26,44 | 2,574 | 22,72 | 3,027 | 26,72 | 2,783 | 24,12 | 22,60 |
| 1896..... | 2,897 | 24,90 | 2,807 | 24,13 | 3,319 | 28,53 | 2,611 | 22,44 | 22,53 |
| 1897..... | 3,022 | 27,09 | 2,802 | 25,12 | 2,833 | 25,40 | 2,497 | 22,89 | 21,08 |
| 1898..... | 2,699 | 23,87 | 2,512 | 23,08 | 3,051 | 28,03 | 2,724 | 25,02 | 20,09 |
| 1899..... | 2,987 | 26,75 | 2,632 | 23,67 | 2,800 | 25,07 | 2,748 | 24,61 | 20,12 |
| 1900..... | 3,368 | 28,84 | 2,778 | 23,79 | 2,906 | 24,89 | 2,626 | 22,48 | 20,82 |
| 1901..... | 3,032 | 26,83 | 2,744 | 24,39 | 2,814 | 24,90 | 2,710 | 23,98 | 19,31 |
| 1902..... | 2,868 | 26,11 | 2,645 | 24,08 | 2,647 | 24,10 | 2,823 | 25,71 | 19,01 |
| 1903..... | 2,962 | 28,05 | 2,515 | 23,65 | 2,594 | 24,40 | 2,541 | 23,90 | 18,29 |
| 1904..... | 2,963 | 27,55 | 2,568 | 24,15 | 2,625 | 24,40 | 2,571 | 23,90 | 18,28 |
| 1905..... | 2,907 | 26,41 | 2,677 | 24,32 | 2,321 | 25,63 | 2,602 | 23,64 | 18,49 |

¹ Population estimated in non-census years on Dr. Farr's formula.

Table XI. — Percentage of Children by Sex and under One, Two and Five Years for each Month during Year 1905.

| | JANUARY. | | | FEBRUARY. | | | MARCH. | | | APRIL. | | | MAY. | | | JUNE. | | |
|-------------------------|-------------|----|-------------------------|-------------|----|------------------------|-------------|----|------------------------|-------------|----|------------------------|-------------|----|------------------------|-------------|----|------------------------|
| | Under 1 yr. | | 2 yrs. and under 5 yrs. | Under 1 yr. | | 1 yr. and under 2 yrs. | Under 1 yr. | | 1 yr. and under 2 yrs. | Under 1 yr. | | 1 yr. and under 2 yrs. | Under 1 yr. | | 1 yr. and under 2 yrs. | Under 1 yr. | | 1 yr. and under 2 yrs. |
| | M. | F. | | M. | F. | | M. | F. | | M. | F. | | M. | F. | | M. | F. | |
| United States..... | 27 | 16 | 8 | 1 | 5 | 4 | 24 | 12 | 4 | 3 | 3 | 2 | 20 | 16 | 5 | 15 | 11 | 7 |
| Ireland..... | 11 | 9 | 3 | 1 | 5 | 4 | 12 | 4 | 3 | 4 | 2 | 4 | 12 | 4 | 3 | 15 | 7 | 3 |
| British Provinces..... | 11 | 4 | 1 | 2 | 1 | 3 | 4 | 2 | 3 | 4 | 2 | 3 | 4 | 2 | 3 | 15 | 7 | 3 |
| Italian..... | 15 | 6 | 1 | 1 | 4 | 3 | 4 | 2 | 3 | 4 | 2 | 3 | 4 | 2 | 3 | 15 | 7 | 3 |
| Russian..... | 5 | 8 | 1 | 1 | 4 | 3 | 4 | 2 | 3 | 4 | 2 | 3 | 4 | 2 | 3 | 15 | 7 | 3 |
| Other foreign..... | 7 | 6 | 2 | 1 | 3 | 8 | 5 | 1 | 2 | 12 | 2 | 1 | 3 | 4 | 2 | 13 | 4 | 1 |
| Mixed..... | 10 | 10 | 3 | 4 | 1 | 10 | 5 | 2 | 1 | 12 | 2 | 1 | 3 | 4 | 2 | 13 | 4 | 1 |
| One parent unknown..... | 5 | 4 | 2 | 1 | 1 | 6 | 9 | 1 | 1 | 15 | 13 | 1 | 1 | 7 | 5 | 18 | 14 | 3 |
| Unknown..... | 5 | 4 | 2 | 1 | 1 | 6 | 9 | 1 | 1 | 15 | 13 | 1 | 1 | 7 | 5 | 18 | 14 | 3 |
| Total..... | 86 | 63 | 20 | 9 | 16 | 21 | 72 | 59 | 18 | 10 | 15 | 16 | 93 | 59 | 22 | 13 | 19 | 17 |

| | JULY. | | | AUGUST. | | | SEPTEMBER. | | | OCTOBER. | | | NOVEMBER. | | | DECEMBER. | | |
|-------------------------|-------------|-----|-------------------------|-------------|----|------------------------|-------------|-----|------------------------|-------------|----|------------------------|-------------|----|------------------------|-------------|----|------------------------|
| | Under 1 yr. | | 2 yrs. and under 5 yrs. | Under 1 yr. | | 1 yr. and under 2 yrs. | Under 1 yr. | | 1 yr. and under 2 yrs. | Under 1 yr. | | 1 yr. and under 2 yrs. | Under 1 yr. | | 1 yr. and under 2 yrs. | Under 1 yr. | | 1 yr. and under 2 yrs. |
| | M. | F. | | M. | F. | | M. | F. | | M. | F. | | M. | F. | | M. | F. | |
| United States..... | 50 | 26 | 6 | 5 | 8 | 4 | 32 | 14 | 4 | 1 | 32 | 14 | 27 | 15 | 1 | 23 | 13 | 8 |
| Ireland..... | 25 | 23 | 3 | 4 | 2 | 8 | 1 | 23 | 4 | 1 | 17 | 12 | 15 | 7 | 2 | 8 | 10 | 4 |
| British Provinces..... | 6 | 7 | 3 | 1 | 2 | 1 | 4 | 1 | 1 | 2 | 3 | 3 | 1 | 1 | 2 | 2 | 4 | 4 |
| Italian..... | 15 | 5 | 5 | 4 | 2 | 1 | 13 | 9 | 1 | 2 | 6 | 6 | 13 | 9 | 7 | 16 | 11 | 7 |
| Russian..... | 8 | 7 | 1 | 2 | 1 | 8 | 9 | 1 | 1 | 2 | 6 | 11 | 6 | 8 | 3 | 12 | 6 | 5 |
| Other foreign..... | 13 | 7 | 2 | 8 | 3 | 2 | 12 | 4 | 1 | 15 | 8 | 3 | 8 | 6 | 3 | 11 | 7 | 1 |
| Mixed..... | 23 | 21 | 5 | 4 | 2 | 2 | 14 | 17 | 1 | 19 | 13 | 3 | 1 | 12 | 9 | 2 | 6 | 4 |
| One parent unknown..... | 22 | 17 | 1 | 1 | 1 | 1 | 13 | 13 | 1 | 15 | 13 | 3 | 1 | 12 | 9 | 2 | 6 | 4 |
| Unknown..... | 4 | 5 | 1 | 1 | 1 | 1 | 2 | 13 | 1 | 2 | 3 | 3 | 1 | 2 | 1 | 7 | 4 | 1 |
| Total..... | 166 | 118 | 27 | 26 | 16 | 14 | 129 | 102 | 14 | 19 | 14 | 16 | 100 | 77 | 15 | 111 | 75 | 30 |

ne Infectious Diseases (Consi

| Y er | EVER. | | TYPHOID FEVER. | | YELLOW FEVER. | |
|---------|---------|-----------------|-------------------------------|--|---------------|-------------------------------|
| | | Deaths from. | Rate per 10,000 Living. | | aths om. | Rate per 10,000 Living. |
| 1840.. | | | | | | |
| 1841.. | | | | | | |
| 1842.. | } 14.99 | | | | | |
| 1843.. | | | | | | |
| 1844.. | | | | | | |
| 1845.. | } 11.41 | | | | | |
| 1846.. | | | | | | |
| 1847.. | | | | | | |
| 1848.. | } 11.41 | | | | | |
| 1849.. | | | | | | |
| 1850.. | | | | | | |

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Table XII. — Cases Reported, and Deaths from Smallpox, Scarlet Fever, Typhoid Fever and Measles, with Percentages.

| DATE. | SMALLPOX. | | Percentages. | DIPHTHERIA AND CROUP. | | Percentages. | SCARLET FEVER. | | Percentages. | TYPHOID FEVER. | | Percentages. | MEASLES. | | Percentages. |
|-----------|-----------|---------|--------------|-----------------------|---------|--------------|----------------|---------|--------------|----------------|---------|--------------|----------|---------|--------------|
| | Cases. | Deaths. | | Cases. | Deaths. | | Cases. | Deaths. | | Cases. | Deaths. | | Cases. | Deaths. | |
| 1872..... | 2,592 | 738 | 28.4 | ..... | ..... | ..... | 1,334 | 104 | 7.7 | ..... | ..... | ..... | ..... | ..... | ..... |
| 1873..... | 1,103 | 392 | 35.3 | ..... | ..... | ..... | 548 | 68 | 8.0 | ..... | ..... | ..... | ..... | ..... | ..... |
| 1874..... | ..... | 2 | 24.5 | ..... | ..... | ..... | 951 | 149 | 15.6 | ..... | ..... | ..... | ..... | ..... | ..... |
| 1875..... | 7 | 1 | 20.0 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 1876..... | 6 | 2 | 33.33 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 1877..... | 17 | 4 | 23.5 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 1878..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 1879..... | ..... | ..... | ..... | 1,370 | 569 | 41.53 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 1880..... | 4 | 1 | 25.0 | 1,167 | 545 | 46.70 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 1881..... | 44 | 6 | 13.6 | 1,715 | 774 | 45.13 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 1882..... | 24 | 8 | 33.3 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 1883..... | 8 | 1 | 12.4 | 1,386 | 802 | 47.74 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 1884..... | ..... | ..... | ..... | 1,415 | 575 | 41.03 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 1885..... | 11 | 1 | 9.0 | 1,212 | 608 | 49.97 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 1886..... | ..... | ..... | ..... | 1,263 | 487 | 40.18 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 1887..... | 4 | ..... | ..... | 1,283 | 450 | 35.03 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 1888..... | ..... | ..... | ..... | 1,188 | 423 | 35.60 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 1889..... | 8 | ..... | ..... | 1,049 | 410 | 39.08 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 1890..... | 10 | 2 | 20.0 | 1,411 | 589 | 41.77 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 1891..... | 1 | ..... | ..... | 1,314 | 683 | 51.95 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 1892..... | ..... | ..... | ..... | 1,475 | 462 | 31.32 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 1893..... | ..... | ..... | ..... | 1,831 | 481 | 26.27 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 1894..... | 96 | 4 | 4.15 | 1,465 | 546 | 37.27 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 1895..... | 77 | 22 | 28.5 | 3,019 | 973 | 32.23 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 1896..... | ..... | ..... | ..... | 4,050 | 644 | 15.91 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 1897..... | ..... | ..... | ..... | 3,368 | 572 | 17.00 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 1898..... | 10 | ..... | ..... | 3,368 | 452 | 13.43 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 1899..... | ..... | ..... | ..... | 1,681 | 359 | 21.36 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 1900..... | 220 | 5 | 2.27 | 2,826 | 304 | 10.73 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 1901..... | 7 | ..... | ..... | 3,377 | 337 | 10.73 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 1902..... | 1,024 | 190 | 18.55 | 3,319 | 353 | 10.63 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 1903..... | 68 | 13 | 19.12 | 2,073 | 223 | 11.33 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 1904..... | ..... | ..... | ..... | 2,368 | 214 | 9.03 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 1905..... | ..... | ..... | ..... | 1,560 | 182 | 11.66 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 1906..... | 5 | 1 | 20.0 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

* Including one case and one death at Quarantine.

† This percentage is not calculated, as the cases were only reported for a part of the year.

Table XIV.—Deaths of White and Colored with Death-rates per 1,000 Inhabitants to Total Deaths, and Deaths from Pneumonia, Cancer, Heart Disease and Kidney Diseases with Death-rates per 10,000 Inhabitants, from 1840 to 1905, inclusive.

| YEARS. | POPULATION. | DEATHS. | | | Death-rate per 1,000 Inhabitants. | Deaths from Pneumonia. | Death-rate per 10,000 Inhabitants. | Deaths from Cancer. | Death-rate per 10,000 Inhabitants. | Deaths from Heart Disease. | Death-rate per 10,000 Inhabitants. | Deaths from Kidney Diseases. | Death-rate per 10,000 Inhabitants. |
|--------|-------------|---------|----------|--------|-----------------------------------|------------------------|------------------------------------|---------------------|------------------------------------|----------------------------|------------------------------------|------------------------------|------------------------------------|
| | | White. | Colored. | Total. | | | | | | | | | |
| 1840 | 84,811 | ..... | ..... | 1,972 | 23.39 | 135 | 16.01 | 17 | 2.02 | 15 | 1.78 | ..... | ..... |
| 1841 | 89,614 | ..... | ..... | 1,919 | 21.41 | 106 | 11.83 | 11 | 1.23 | 28 | 3.12 | ..... | ..... |
| 1842 | 95,251 | ..... | ..... | 2,426 | 25.47 | 181 | 19.00 | 10 | 1.05 | 42 | 4.40 | ..... | ..... |
| 1843 | 101,242 | ..... | ..... | 2,197 | 21.70 | 167 | 16.49 | 14 | 1.38 | 34 | 3.36 | ..... | ..... |
| 1844 | 107,610 | ..... | ..... | 2,241 | 20.82 | 182 | 12.26 | 27 | 2.50 | 38 | 3.53 | ..... | ..... |
| 1845 | 114,966 | ..... | ..... | 2,585 | 22.60 | 167 | 14.60 | 15 | 1.31 | 33 | 2.88 | ..... | ..... |
| 1846 | 118,551 | ..... | ..... | 3,989 | 33.59 | 234 | 19.74 | 19 | 1.60 | 42 | 3.54 | ..... | ..... |
| 1847 | 122,890 | ..... | ..... | 4,122 | 33.54 | 133 | 15.70 | 13 | 1.06 | 58 | 4.72 | ..... | ..... |
| 1848 | 127,387 | ..... | ..... | 3,972 | 31.18 | 190 | 14.91 | 22 | 1.73 | 62 | 4.87 | ..... | ..... |
| 1849 | 132,048 | ..... | ..... | 5,079 | 38.46 | 265 | 20.07 | 18 | 1.36 | 82 | 6.21 | ..... | ..... |
| 1850 | 136,881 | ..... | 85 | 3,668 | 26.80 | 290 | 21.19 | 29 | 2.12 | 52 | 3.80 | ..... | ..... |
| 1851 | 141,308 | ..... | 66 | 3,856 | 27.29 | 262 | 18.54 | 32 | 1.34 | 86 | 6.09 | ..... | ..... |
| 1852 | 145,878 | ..... | 60 | 3,736 | 25.61 | 226 | 15.49 | 39 | 2.19 | 79 | 5.42 | ..... | ..... |
| 1853 | 150,595 | ..... | 58 | 4,226 | 28.46 | 245 | 16.27 | 22 | 1.46 | 78 | 5.18 | ..... | ..... |
| 1854 | 155,464 | ..... | 77 | 4,443 | 28.58 | 260 | 16.72 | 23 | 1.48 | 83 | 5.34 | ..... | ..... |
| 1855 | 160,494 | ..... | 63 | 4,400 | 25.42 | 220 | 13.70 | 31 | 1.93 | 95 | 5.92 | ..... | ..... |
| 1856 | 163,820 | ..... | 71 | 4,253 | 25.96 | 258 | 15.75 | 16 | .98 | 115 | 7.02 | ..... | ..... |
| 1857 | 167,218 | ..... | 73 | 3,958 | 23.67 | 108 | 6.46 | 29 | 1.73 | 102 | 6.10 | ..... | ..... |
| 1858 | 170,685 | ..... | 60 | 3,840 | 22.50 | 105 | 6.15 | 41 | 2.40 | 96 | 5.62 | ..... | ..... |
| 1859 | 174,227 | ..... | 58 | 3,738 | 21.45 | 191 | 10.96 | 45 | 2.58 | 107 | 6.14 | ..... | ..... |
| 1860 | 177,840 | ..... | 68 | 4,390 | 24.68 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 1861 | 180,646 | ..... | 54 | 3,965 | 21.95 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 1862 | 183,497 | ..... | 47 | 4,120 | 22.45 | 266 | 13.95 | 50 | 2.72 | 115 | 6.97 | ..... | ..... |
| 1863 | 186,390 | ..... | 102 | 4,639 | 24.16 | 329 | 17.65 | 52 | 2.79 | 135 | 7.24 | ..... | ..... |
| 1864 | 189,331 | ..... | 109 | 5,111 | 26.99 | 382 | 20.18 | 50 | 2.64 | 142 | 7.50 | ..... | ..... |
| 1865 | 192,318 | ..... | 93 | 4,541 | 23.61 | 314 | 16.33 | 57 | 2.96 | 125 | 6.50 | ..... | ..... |
| 1866 | 194,506 | ..... | 91 | 4,379 | 22.51 | 334 | 17.17 | 78 | 4.01 | 137 | 7.04 | ..... | ..... |

| | | | | | | | | | | | | | |
|------|---------|--------|-----|--------|-------|-------|-------|-----|-------|-------|-------|-----|------|
| 1867 | 997,593 | 4,313 | 108 | 4,431 | 19,48 | 927 | 9.96 | 82 | 3.60 | 139 | 6.11 | 61 | 2.68 |
| 1868 | 931,024 | 5,429 | 90 | 5,519 | 23.89 | 358 | 15.50 | 56 | 3.67 | 173 | 7.44 | 82 | 2.55 |
| 1869 | 946,941 | 5,377 | 146 | 5,463 | 22.45 | 402 | 16.30 | 107 | 4.84 | 159 | 6.44 | 107 | 4.84 |
| 1870 | 256,526 | 5,097 | 133 | 5,100 | 22.35 | 336 | 13.41 | 111 | 4.43 | 196 | 7.82 | 131 | 4.83 |
| 1871 | 268,082 | 5,782 | 126 | 5,888 | 22.82 | 627 | 20.42 | 102 | 3.96 | 239 | 9.62 | 143 | 5.20 |
| 1872 | 265,764 | 7,917 | 373 | 8,040 | 30.44 | 517 | 19.45 | 104 | 3.91 | 207 | 7.79 | 170 | 6.70 |
| 1873 | 321,220 | 7,624 | 245 | 7,869 | 24.50 | 463 | 14.41 | 141 | 4.39 | 144 | 4.48 | 149 | 4.64 |
| 1874 | 331,395 | 7,614 | 198 | 7,813 | 23.57 | 571 | 17.23 | 140 | 4.22 | 328 | 8.90 | 172 | 5.19 |
| 1875 | 341,919 | 8,901 | 159 | 9,060 | 26.50 | 632 | 18.45 | 163 | 3.01 | 352 | 9.42 | 142 | 4.13 |
| 1876 | 346,004 | 8,099 | 154 | 8,253 | 23.85 | 523 | 15.11 | 164 | 4.73 | 369 | 10.66 | 196 | 3.64 |
| 1877 | 350,138 | 7,142 | 174 | 7,316 | 20.89 | 484 | 16.42 | 190 | 5.43 | 285 | 8.14 | 176 | 5.02 |
| 1878 | 354,322 | 7,492 | 144 | 7,686 | 21.55 | 681 | 18.62 | 196 | 5.03 | 359 | 10.13 | 204 | 5.76 |
| 1879 | 358,554 | 7,202 | 136 | 7,398 | 20.63 | 613 | 17.10 | 195 | 5.44 | 383 | 10.68 | 198 | 5.32 |
| 1880 | 362,889 | 8,363 | 168 | 8,531 | 23.51 | 690 | 17.91 | 229 | 6.31 | 425 | 11.71 | 236 | 6.28 |
| 1881 | 368,190 | 8,782 | 234 | 9,016 | 24.49 | 684 | 18.58 | 241 | 6.55 | 465 | 12.63 | 259 | 7.03 |
| 1882 | 373,620 | 8,787 | 208 | 8,966 | 24.07 | 681 | 18.23 | 253 | 6.77 | 569 | 13.62 | 279 | 7.47 |
| 1883 | 379,129 | 9,513 | 227 | 9,740 | 25.69 | 767 | 19.97 | 283 | 7.73 | 528 | 13.93 | 280 | 7.89 |
| 1884 | 384,720 | 9,374 | 248 | 9,622 | 25.01 | 764 | 19.86 | 282 | 7.33 | 590 | 13.78 | 306 | 7.96 |
| 1885 | 390,393 | 9,386 | 232 | 9,618 | 24.64 | 963 | 21.67 | 274 | 7.02 | 563 | 14.42 | 343 | 8.79 |
| 1886 | 401,374 | 9,032 | 216 | 9,268 | 23.09 | 778 | 19.38 | 269 | 7.45 | 581 | 14.37 | 340 | 8.47 |
| 1887 | 412,663 | 9,824 | 249 | 10,073 | 24.41 | 795 | 19.16 | 324 | 7.86 | 619 | 15.00 | 331 | 8.02 |
| 1888 | 424,274 | 9,352 | 245 | 10,197 | 24.03 | 990 | 23.33 | 279 | 6.98 | 688 | 15.74 | 335 | 7.90 |
| 1889 | 436,208 | 10,019 | 240 | 10,259 | 23.52 | 934 | 21.41 | 306 | 7.01 | 789 | 18.09 | 319 | 7.31 |
| 1890 | 448,477 | 9,620 | 261 | 10,181 | 23.70 | 1,092 | 24.35 | 326 | 7.27 | 788 | 17.46 | 297 | 6.62 |
| 1891 | 457,772 | 10,301 | 270 | 10,571 | 23.09 | 1,149 | 25.10 | 317 | 6.93 | 764 | 16.69 | 324 | 7.08 |
| 1892 | 467,260 | 10,351 | 285 | 11,286 | 24.05 | 1,223 | 32.29 | 328 | 7.02 | 890 | 19.07 | 356 | 7.40 |
| 1893 | 476,945 | 11,427 | 298 | 11,286 | 24.56 | 1,540 | 32.29 | 310 | 6.50 | 785 | 16.46 | 378 | 7.88 |
| 1894 | 486,830 | 11,222 | 298 | 11,710 | 23.66 | 1,119 | 22.99 | 354 | 7.37 | 839 | 17.23 | 373 | 7.66 |
| 1895 | 501,088 | 11,034 | 235 | 11,829 | 22.60 | 1,268 | 25.30 | 381 | 7.80 | 870 | 17.36 | 377 | 7.52 |
| 1896 | 516,306 | 11,810 | 324 | 11,634 | 22.53 | 1,387 | 26.86 | 389 | 7.63 | 861 | 16.87 | 410 | 7.94 |
| 1897 | 526,912 | 10,862 | 292 | 11,154 | 21.09 | 1,286 | 23.36 | 400 | 7.06 | 913 | 17.26 | 409 | 7.73 |
| 1898 | 541,827 | 10,620 | 266 | 10,886 | 20.09 | 1,169 | 21.67 | 412 | 7.60 | 934 | 17.23 | 408 | 7.44 |
| 1899 | 556,057 | 10,858 | 309 | 11,578 | 20.12 | 1,465 | 26.21 | 402 | 7.24 | 966 | 17.40 | 428 | 7.71 |
| 1900 | 560,892 | 11,386 | 292 | 11,678 | 20.82 | 1,241 | 22.13 | 452 | 8.06 | 1,009 | 17.99 | 423 | 7.52 |
| 1901 | 567,617 | 11,008 | 292 | 11,300 | 19.91 | 1,069 | 19.36 | 455 | 8.82 | 963 | 16.97 | 534 | 9.41 |
| 1902 | 574,465 | 10,645 | 338 | 10,863 | 19.01 | 1,115 | 19.41 | 482 | 8.39 | 1,033 | 17.96 | 556 | 9.68 |
| 1903 | 581,357 | 10,335 | 297 | 10,767 | 18.28 | 1,265 | 21.76 | 511 | 8.81 | 992 | 17.06 | 563 | 9.68 |
| 1904 | 588,320 | 10,469 | 288 | 10,757 | 18.28 | 1,223 | 22.49 | 565 | 9.60 | 1,066 | 17.95 | 543 | 9.23 |
| 1905 | 596,380 | 10,750 | 267 | 11,007 | 18.49 | 1,274 | 21.40 | 628 | 10.55 | 1,062 | 16.17 | 568 | 9.54 |

COMPARATIVE DEATHS IN AMERICAN AND FOREIGN CITIES.

The following tables have been prepared to show the comparison of deaths in a few large American and foreign cities, as compared with the City of Boston. It is to be regretted that the amount of information desired is not fully complete, owing to the scarcity of material and information furnished, but, in their present condition, as a matter of reference, they may be of value :

Table XVI. — Boston.

| YEARS. | Population. | Total Deaths. | Population of Children under 5 years of age. ¹ | Deaths of Children under 5 years of age. | Deaths from Diphtheria. | Deaths from Scarlatina. | Deaths from Typhoid Fever. | Deaths from Measles. |
|-----------|-------------|---------------|---|--|-------------------------|-------------------------|----------------------------|----------------------|
| 1880..... | 362,839 | 8,531 | 29,649 | 3,349 | 568 | 33 | 154 | 49 |
| 1881..... | 368,190 | 9,016 | 30,809 | 3,314 | 601 | 35 | 207 | 108 |
| 1882..... | 373,623 | 8,995 | 31,969 | 3,151 | 458 | 75 | 212 | 25 |
| 1883..... | 379,129 | 9,740 | 33,129 | 3,627 | 445 | 211 | 198 | 152 |
| 1884..... | 384,720 | 9,622 | 34,289 | 3,570 | 345 | 209 | 216 | 13 |
| 1885..... | 390,393 | 9,618 | 35,449 | 3,466 | 334 | 156 | 162 | 84 |
| 1886..... | 401,374 | 9,268 | 36,582 | 3,186 | 329 | 81 | 135 | 36 |
| 1887..... | 412,663 | 10,073 | 37,717 | 3,662 | 316 | 196 | 183 | 119 |
| 1888..... | 424,274 | 10,197 | 38,849 | 3,509 | 470 | 65 | 170 | 27 |
| 1889..... | 436,208 | 10,259 | 39,983 | 3,633 | 564 | 23 | 186 | 48 |
| 1890..... | 448,477 | 10,181 | 40,001 | 3,349 | 401 | 42 | 155 | 19 |
| 1891..... | 457,772 | 10,571 | 41,358 | 3,608 | 232 | 64 | 154 | 21 |
| 1892..... | 467,260 | 11,236 | 42,715 | 3,735 | 414 | 262 | 137 | 19 |
| 1893..... | 476,945 | 11,710 | 44,072 | 3,987 | 476 | 248 | 148 | 27 |
| 1894..... | 486,830 | 11,520 | 45,480 | 4,108 | 817 | 192 | 141 | 8 |
| 1895..... | 501,083 | 11,329 | 46,787 | 3,935 | 588 | 114 | 163 | 19 |
| 1896..... | 516,305 | 11,634 | 48,902 | 4,065 | 516 | 121 | 162 | 27 |
| 1897..... | 528,912 | 11,154 | 51,017 | 3,708 | 411 | 136 | 173 | 21 |
| 1898..... | 541,827 | 10,886 | 53,131 | 3,577 | 170 | 33 | 185 | 27 |
| 1899..... | 555,057 | 11,167 | 55,246 | 3,581 | 277 | 74 | 165 | 33 |
| 1900..... | 560,892 | 11,678 | 57,361 | 3,752 | * 537 | 181 | 143 | 88 |
| 1901..... | 567,617 | 11,300 | 59,476 | 3,469 | * 363 | 210 | 142 | 103 |
| 1902..... | 574,465 | 10,968 | 61,591 | 3,367 | 225 | 87 | 139 | 66 |
| 1903..... | 581,357 | 10,632 | 63,706 | 3,079 | 214 | 65 | 119 | 50 |
| 1904..... | 588,320 | 10,757 | 65,821 | 3,105 | 206 | 39 | 135 | 89 |
| 1905..... | 595,380 | 11,007 | 67,936 | 3,024 | 132 | 44 | 117 | 54 |

¹ Estimated. * The deaths from diphtheria since 1899 include membranous croup.

Table XVII. — (Old City of) New York, N. Y.

| YEARS. | Population. | Total Deaths. | Population of Children under 5 years of age. ¹ | Deaths of Children under 5 years of age. | Deaths from Diphtheria. | Deaths from Scarlatina. | Deaths from Typhoid Fever. | Deaths from Measles. |
|-------------------------|-------------|---------------|---|--|-------------------------|-------------------------|----------------------------|----------------------|
| 1880 ¹ | 1,209,268 | 31,987 | 140,673 | 14,650 | 1,390 | 618 | 372 | 479 |
| 1881..... | 1,246,011 | 38,624 | 144,947 | 17,737 | 2,249 | 1,964 | 594 | 429 |
| 1882..... | 1,283,870 | 37,924 | 149,351 | 17,520 | 1,525 | 2,066 | 516 | 913 |
| 1883..... | 1,322,880 | 34,011 | 153,889 | 18,866 | 1,009 | 744 | 625 | 716 |
| 1884..... | 1,363,075 | 35,044 | 158,565 | 15,272 | 1,090 | 608 | 476 | 762 |
| 1885..... | 1,404,401 | 35,682 | 163,388 | 15,267 | 1,325 | 559 | 405 | 736 |
| 1886..... | 1,447,166 | 37,351 | 168,347 | 16,121 | 1,727 | 371 | 433 | 668 |
| 1887..... | 1,491,137 | 38,933 | 173,462 | 16,766 | 2,167 | 569 | 421 | 767 |
| 1888..... | 1,536,444 | 40,175 | 178,733 | 17,358 | 1,914 | 1,361 | 364 | 591 |
| 1889..... | 1,583,120 | 39,679 | 184,164 | 17,152 | 1,686 | 1,242 | 397 | 470 |
| 1890..... | 1,631,232 | 40,108 | 189,760 | 16,305 | 1,262 | 408 | 352 | 730 |
| 1891..... | 1,680,796 | 43,659 | 195,525 | 18,224 | 1,361 | 1,220 | 384 | 663 |
| 1892..... | 1,708,124 | 44,317 | ..... | 18,589 | 1,425 | 975 | 399 | 863 |
| 1893..... | 1,758,010 | 44,479 | ..... | 17,914 | 1,968 | 552 | 381 | 390 |
| 1894..... | 1,809,353 | 41,175 | ..... | 17,596 | 2,359 | 541 | 326 | 584 |
| 1895..... | 1,873,201 | 43,420 | 210,523 | 18,221 | 1,634 | 468 | 322 | 793 |
| 1896 ¹ | 1,906,139 | 41,622 | 210,523 | 16,807 | 1,555 | 402 | 297 | 714 |
| 1897..... | 1,940,553 | 38,887 | 226,327 | 15,394 | 1,377 | 500 | 299 | 391 |
| 1898..... | 1,976,572 | 40,438 | 233,150 | 15,591 | 922 | 524 | 376 | 446 |
| 1899..... | 2,014,330 | 39,911 | 240,714 | 14,391 | 940 | 332 | 294 | 379 |
| 1900..... | 2,053,979 | 43,227 | 233,587 | 15,646 | 1,121 | 315 | 372 | 470 |
| 1901..... | 2,095,686 | 43,307 | 239,708 | 14,810 | 1,227 | 635 | 412 | 272 |
| 1902..... | 2,139,682 | 41,704 | 245,202 | 15,019 | 1,142 | 635 | 400 | 462 |
| 1903..... | 2,186,017 | 41,776 | 250,517 | 13,741 | 1,232 | 465 | 350 | 321 |
| 1904..... | 2,235,060 | 48,743 | 256,187 | 16,136 | 1,272 | 534 | 309 | 556 |
| 1905..... | 2,390,382 | 45,199 | 273,937 | 15,287 | 860 | 271 | 310 | 314 |

¹ Estimated July 1, 1896.

Table XVIII. — Philadelphia, Pa.

| YEARS. | Population. | Total Deaths. | Population of Children under 5 years of age. | Deaths of Children under 5 years of age. | Deaths from Diphtheria. | Deaths from Scarlatina. | Deaths from Typhoid Fever. | Deaths from Measles. |
|-------------------------|-------------|---------------|--|--|-------------------------|-------------------------|----------------------------|----------------------|
| 1880 ¹ | 846,980 | 17,711 | ¹ 91,544 | 6,594 | 323 | 291 | 498 | 108 |
| 1881..... | 868,000 | 19,515 | ² 92,744 | 7,124 | 457 | 486 | 645 | 17 |
| 1882..... | 886,539 | 20,059 | 94,044 | 7,254 | 983 | 310 | 650 | 91 |
| 1883..... | 907,041 | 20,076 | 95,234 | 7,417 | 1,006 | 561 | 579 | 58 |
| 1884..... | 927,995 | 19,999 | 96,465 | 7,606 | 680 | 540 | 662 | 96 |
| 1885..... | 949,432 | 21,392 | 97,965 | 8,188 | 600 | 375 | 610 | 131 |
| 1886..... | 971,363 | 20,005 | 98,925 | 7,351 | 411 | 248 | 618 | 19 |
| 1887..... | 993,801 | 21,719 | 100,155 | 8,421 | 416 | 159 | 621 | 358 |
| 1888..... | 1,016,758 | 20,372 | 101,386 | 7,269 | 350 | 235 | 785 | 24 |
| 1889..... | 1,040,245 | 20,536 | 102,616 | 7,752 | 375 | 298 | 736 | 92 |
| 1890 ¹ | 1,046,964 | 21,732 | ¹ 103,547 | 7,913 | 528 | 189 | 666 | 105 |
| 1891..... | 1,069,264 | 23,367 | 105,077 | 8,479 | 918 | 341 | 684 | 25 |
| 1892..... | 1,092,168 | 24,305 | ..... | 9,305 | 1,425 | 484 | 539 | 74 |
| 1893..... | 1,115,562 | 23,655 | ..... | 8,690 | 892 | 267 | 456 | 88 |
| 1894..... | 1,139,457 | 22,680 | ..... | 8,160 | 1,047 | 154 | 369 | 33 |
| 1895..... | 1,163,864 | 23,797 | ..... | 8,401 | 1,020 | 79 | 469 | 84 |
| 1896..... | 1,188,798 | 23,982 | ..... | 8,661 | 862 | 61 | 402 | 191 |
| 1897..... | 1,214,256 | 22,735 | ..... | 7,605 | 1,231 | 282 | 401 | 64 |
| 1898..... | 1,240,266 | 23,790 | ..... | 7,998 | 998 | 114 | ³ 639 | 234 |
| 1899..... | 1,266,832 | 23,796 | ..... | 7,056 | 849 | 132 | 948 | 7 |
| 1900..... | 1,293,697 | 25,078 | ..... | 8,078 | 898 | 163 | 449 | 382 |
| 1901..... | 1,321,408 | 24,137 | ..... | 6,840 | 525 | 219 | 444 | 26 |
| 1902..... | 1,349,712 | 23,847 | ..... | 6,922 | 435 | 143 | 588 | 112 |
| 1903..... | 1,378,624 | 25,947 | ..... | 7,079 | 521 | 159 | 744 | 220 |
| 1904..... | 1,408,154 | 25,972 | 142,771 | 7,369 | 542 | 201 | 957 | 141 |
| 1905..... | 1,438,318 | 24,807 | 145,845 | 6,978 | 452 | 60 | 684 | 53 |

¹ Census years.² Estimated on the increase of census years.³ Seventy-three of these were soldiers who contracted the disease in camps.

Table XIX. — Chicago, Ill.

| YEARS. | Population Estimated. | Total Deaths. | Population of Children un- der 5 years of age. | Deaths of Chil- dren under 5 years of age. | Deaths from Diphtheria. | Deaths from Scarlatina. | Deaths from Typhoid Fever. | Deaths from Measles. |
|-----------|--------------------------|---------------|---|--|----------------------------|----------------------------|----------------------------------|-------------------------|
| 1880..... | 508,298 | 10,482 | | | | | | |
| 1881..... | 540,000 | 13,874 | | | | | | |
| 1882..... | 560,639 | 13,234 | | 6,645 | | | | |
| 1883..... | 580,000 | 11,555 | | 5,875 | | | | |
| 1884..... | 630,000 | 12,471 | | 6,666 | | | | |
| 1885..... | 665,000 | 12,474 | | 6,187 | 706 | 279 | 496 | 78 |
| 1886..... | 704,000 | 13,699 | | 6,763 | 944 | 220 | 483 | 126 |
| 1887..... | 760,000 | 15,400 | | 7,568 | 1,002 | 190 | 381 | 341 |
| 1888..... | 830,000 | 15,772 | | 7,533 | 858 | 184 | 375 | 151 |
| 1889..... | 1,106,000 | 16,946 | | 8,204 | 1,126 | 185 | 453 | 204 |
| 1890..... | 1,200,000 | 21,869 | | 9,954 | 881 | 193 | 1,008 | 67 |
| 1891..... | 1,250,000 | 27,754 | | 12,801 | 958 | 499 | 1,997 | 265 |
| 1892..... | 1,438,000 | 26,219 | | 11,662 | 1,014 | 382 | 1,489 | 185 |
| 1893..... | 1,600,000 | 27,095 | | 12,364 | 975 | 329 | 670 | 234 |
| 1894..... | 1,567,727 | 23,701 | | 12,363 | 841 | 190 | 491 | 182 |
| 1895..... | 1,600,000 | 24,319 | 227,200 | 10,449 | 1,775 | 77 | 518 | 158 |
| 1896..... | ¹ 1,619,226 | 23,262 | 192,453 | 15,336 | 955 | 54 | 751 | 73 |
| 1897..... | 1,619,226 | 21,809 | 192,453 | 8,546 | 702 | 81 | 437 | 139 |
| 1898..... | 1,650,000 | 22,747 | 196,198 | 8,135 | 622 | 67 | 636 | 55 |
| 1899..... | 1,950,000 | 25,503 | 196,239 | 8,880 | 843 | 533 | 442 | 168 |
| 1900..... | 1,698,575 | 24,941 | 220,824 | 8,282 | 797 | 226 | 337 | 194 |
| 1901..... | 1,758,025 | 24,406 | | 7,489 | 495 | 165 | 509 | 158 |
| 1902..... | 1,820,000 | 26,455 | 204,061 | 8,027 | 596 | 445 | 801 | 123 |
| 1903..... | 1,885,000 | 28,923 | 211,200 | 7,879 | 614 | 296 | 588 | 276 |
| 1904..... | 1,932,315 | 26,302 | 202,893 | 7,052 | 395 | 143 | 373 | 47 |
| 1905..... | 1,990,750 | 27,212 | 222,601 | 8,512 | 426 | 79 | 329 | 231 |

¹ School census, July 1, 1896.

Table XX.—Brooklyn, N. Y.

| YEARS. | Population. | Total Deaths. | Population of Children under 5 years of age. | Deaths of Children under 5 years of age. | Deaths from Diphtheria. | Deaths from Scarletina. | Deaths from Typhoid Fever. | Deaths from Measles. | Deaths from Consumption. |
|-----------|-------------|---------------|--|--|-------------------------|-------------------------|----------------------------|----------------------|--------------------------|
| 1885..... | 687,000 | 15,369 | 89,310 | 6,756 | 519 | 363 | 153 | 175 | 1,995 |
| 1886..... | 747,000 | 15,790 | 97,110 | 7,000 | 782 | 340 | 123 | 106 | 2,085 |
| 1887..... | 778,800 | 17,079 | 101,140 | 7,577 | 950 | 271 | 143 | 172 | 2,026 |
| 1888..... | 810,000 | 18,061 | 105,300 | 8,019 | 984 | 475 | 158 | 59 | 2,051 |
| 1889..... | 842,000 | 18,480 | 109,460 | 8,265 | 1,101 | 273 | 161 | 205 | 2,055 |
| 1890..... | 875,000 | 19,827 | 113,750 | 8,462 | 902 | 227 | 182 | 111 | 2,169 |
| 1891..... | 910,000 | 21,349 | 118,300 | 9,388 | 766 | 485 | 180 | 203 | 2,117 |
| 1892..... | 898,256 | 20,807 | 122,850 | 8,971 | 775 | 412 | 162 | 168 | 2,128 |
| 1893..... | 928,408 | 21,017 | 127,400 | 8,763 | 607 | 307 | 179 | 111 | 2,174 |
| 1894..... | 959,572 | 21,183 | 135,850 | 9,235 | 1,279 | 188 | 158 | 204 | 2,260 |
| 1895..... | 991,782 | 22,568 | 124,000 | 9,277 | 1,139 | 124 | 173 | 192 | 2,299 |
| 1896..... | 1,025,074 | 22,497 | 146,000 | 9,006 | 1,063 | 150 | 163 | 333 | 2,245 |
| 1897..... | 1,060,483 | 20,674 | 130,500 | 8,252 | 795 | 187 | 173 | 190 | 2,164 |
| 1898..... | 1,095,047 | 21,856 | 134,793 | 8,414 | 742 | 159 | 267 | 193 | 2,384 |
| 1899..... | 1,131,805 | 21,649 | ..... | 8,072 | 583 | 175 | 205 | 197 | 2,435 |
| 1900..... | 1,169,796 | 23,067 | ¹ 131,719 | 8,776 | 673 | 130 | 301 | 310 | 2,445 |
| 1901..... | 1,209,064 | 23,271 | 124,500 | 8,151 | 733 | 496 | 274 | 160 | 2,474 |
| 1902..... | 1,249,650 | 22,344 | 145,324 | 7,988 | 762 | 275 | 322 | 239 | 2,317 |
| 1903..... | 1,291,597 | 22,192 | ..... | 7,068 | 830 | 244 | 267 | 167 | 2,376 |
| 1904..... | 1,334,952 | 24,531 | 155,254 | 8,042 | 706 | 282 | 303 | 333 | 2,634 |
| 1905..... | 1,362,352 | 23,935 | 158,441 | 7,794 | 594 | 132 | 297 | 198 | 2,420 |

¹ Estimated.

Table XXI. — St. Louis.

| YEARS. | Population. | Total Deaths. | Deaths of Children under 5 years of age. | Deaths from Diphtheria. | Deaths from Scarlet Fever. | Deaths from Typhoid Fever. | Deaths from Measles. | Deaths from Consumption. |
|-----------|-------------|---------------|--|------------------------------------|----------------------------|----------------------------|----------------------|--------------------------|
| 1885..... | 400,000 | 7,490 | 3,090 | <i>Diph. — Croup.</i> 392 — 109 | 164 | 125 | 54 | 888 |
| 1886..... | 400,000 | 8,268 | 3,434 | 719 — 160 | 149 | 124 | 6 | 915 |
| 1887..... | 420,000 | 9,155 | 3,795 | 927 — 185 | 48 | 116 | 40 | 829 |
| 1888..... | 440,000 | 9,015 | 3,659 | 564 — 167 | 30 | 130 | 31 | 800 |
| 1889..... | 450,000 | 8,004 | 3,149 | 345 — 94 | 114 | 146 | 63 | 655 |
| 1890..... | 460,000 | 8,409 | 3,115 | 186 — 58 | 87 | 140 | 1 | 843 |
| 1891..... | 480,000 | 9,530 | 3,493 | 250 — 90 | 96 | 165 | 53 | 869 |
| 1892..... | 500,000 | 10,225 | 3,607 | 195 — 91 | 150 | 441 | 7 | 882 |
| 1893..... | 520,000 | 10,303 | 3,548 | 227 — 144 | 79 | 215 | 26 | 984 |
| 1894..... | 540,000 | 8,710 | 3,192 | 240 — 139 | 29 | 171 | 3 | 875 |
| 1895..... | 560,000 | 9,425 | 3,373 | 512 — 171 | 18 | 107 | 38 | 1,000 |
| 1896..... | 570,000 | 9,897 | 3,326 | 273 — | 11 | 108 | 17 | 1,026 |
| 1897..... | 600,000 | 9,554 | 2,799 | 170 — 70 | 19 | 123 | 1 | 997 |
| 1898..... | 623,000 | 8,908 | 3,358 | 152 — 51 | 28 | 95 | 21 | 1,001 |
| 1899..... | 640,000 | 10,024 | 3,005 | 192 — | 34 | 131 | 15 | 1,091 |
| 1900..... | 575,200 | 9,849 | ..... | 344 — 64 | 57 | 148 | 45 | 1,006 |
| 1901..... | 598,000 | 10,601 | ..... | 259 — | 69 | 176 | 34 | 1,128 |
| 1902..... | 621,000 | 10,353 | 2,671 | 160 — | 132 | 222 | 10 | 1,131 |
| 1903..... | 645,000 | 11,145 | 2,842 | 162 — | 89 | 288 | 140 | 1,126 |
| 1904..... | 685,000 | 11,506 | 2,443 | 136 — | 64 | 225 | 33 | 1,328 |
| 1905..... | 685,000 | 10,342 | 2,196 | 111 — | 13 | 122 | 52 | 1,257 |

Table XXII.—London, England.

| YEARS. | Population. | Total Deaths. | Population of Children under 5 years of age. | Deaths of Children under 5 years of age. | Deaths from Diphtheria. | Deaths from Scarlatina. | Deaths from Typhoid Fever. | Deaths from Measles. |
|-------------------------|-------------|---------------|--|--|-------------------------|-------------------------|----------------------------|----------------------|
| 1880..... | 3,771,139 | 81,882 | ..... | 36,220 | 544 | 3,100 | 702 | 1,521 |
| 1881..... | 3,824,960 | 81,071 | 497,044 | 33,325 | 654 | 2,108 | 977 | 2,533 |
| 1882..... | 3,861,876 | 82,905 | ..... | 36,259 | 863 | 2,004 | 975 | 2,329 |
| 1883..... | 3,901,164 | 80,578 | ..... | 33,552 | 961 | 1,989 | 935 | 2,420 |
| 1884..... | 3,939,832 | 83,050 | ..... | 36,080 | 973 | 1,444 | 936 | 2,285 |
| 1885..... | 3,978,883 | 80,000 | ..... | 32,913 | 896 | 707 | 585 | 2,928 |
| 1886..... | 4,018,321 | 82,276 | ..... | 34,319 | 846 | 688 | 618 | 2,078 |
| 1887..... | 4,058,150 | 82,304 | ..... | 35,226 | 953 | 1,419 | 612 | 2,904 |
| 1888..... | 4,098,374 | 79,099 | ..... | 32,069 | 1,311 | 1,190 | 694 | 2,425 |
| 1889..... | 4,138,996 | 76,026 | ..... | 30,469 | 1,616 | 771 | 528 | 2,308 |
| 1890..... | 4,180,021 | 89,554 | ..... | 36,123 | 1,417 | 876 | 618 | 3,291 |
| 1891..... | 4,221,452 | 90,316 | 501,558 | 33,340 | 1,321 | 589 | 547 | 1,807 |
| 1892..... | 4,263,294 | 87,749 | ..... | 34,560 | 1,885 | 1,174 | 486 | 3,393 |
| 1893..... | 4,306,411 | 91,536 | ..... | 35,200 | 3,265 | 1,596 | 719 | 1,661 |
| 1894..... | 4,349,166 | 77,089 | ..... | 31,366 | 2,670 | 962 | 635 | 3,298 |
| 1895..... | 4,392,346 | 86,937 | ..... | 35,095 | 2,316 | 829 | 614 | 2,633 |
| 1896..... | 4,431,955 | 83,511 | ..... | 35,599 | 2,683 | 942 | 591 | 3,697 |
| 1897..... | 4,463,169 | 80,944 | ..... | 32,238 | 2,263 | 781 | 593 | 1,928 |
| 1898..... | 4,504,766 | 83,936 | 536,522 | 34,184 | 1,772 | 583 | 585 | 3,075 |
| 1899..... | 4,506,752 | 89,689 | 541,523 | 32,073 | 1,964 | 396 | 801 | 2,143 |
| 1900..... | 4,589,129 | 86,007 | 546,570 | 30,979 | 1,568 | 361 | 756 | 1,986 |
| 1901..... | 4,544,983 | 79,924 | ..... | ..... | 1,344 | 584 | 548 | 1,968 |
| 1902..... | 4,579,110 | 82,540 | 500,359 | 28,768 | 1,181 | 563 | 585 | 2,362 |
| 1903..... | 4,613,812 | 72,019 | 504,050 | 25,627 | 1 752 | 362 | 3 896 | 2,054 |
| 1904 ¹ | 4,649,088 | 76,694 | ..... | ..... | 753 | 365 | 297 | 2,264 |
| 1905 ² | 4,684,794 | 73,002 | 518,794 | 24,838 | 553 | 549 | 246 | 1,715 |

¹ Excluding group.² Including group³ Deaths for 52 weeks.

Table XXIII. — Paris, France.

| YEARS. | Population. | Total Deaths. | Population of Children under 5 years of age. ¹ | Deaths of Children under 5 years of age. | Deaths from Diphtheria. | Deaths from Scarlatina. | Deaths from Typhoid Fever. | Deaths from Measles. |
|-------------------------------|-------------|---------------------|---|--|-------------------------|-------------------------|----------------------------|----------------------|
| 1880..... | | 55,706 | | 17,674 | 2,048 | 345 | 2,008 | 962 |
| 1881..... | 2,239,938 | 55,108 | 148,601 | 17,159 | 2,211 | 440 | 1,955 | 897 |
| 1882..... | | 56,854 | | 17,158 | 2,244 | 166 | 3,214 | 1,005 |
| 1883..... | | 54,763 | | 16,843 | 1,781 | 88 | 1,880 | 1,043 |
| 1884..... | | 55,050 | | 16,968 | 1,928 | 155 | 1,508 | 1,501 |
| 1885..... | | 52,726 | | 15,244 | 1,655 | 191 | 1,320 | 1,524 |
| 1886..... | 2,260,945 | 55,110 | 146,177 | 16,498 | 1,512 | 403 | 954 | 1,210 |
| 1887..... | | 52,836 | | 15,206 | 1,585 | 224 | 1,335 | 1,628 |
| 1888..... | | 51,230 | | 14,463 | 1,729 | 198 | 756 | 915 |
| 1889..... | | 54,083 | | 14,679 | 1,706 | 170 | 1,008 | 1,190 |
| 1890..... | | 54,556 | 150,490 | 15,068 | 1,668 | 223 | 665 | 1,495 |
| Census of 12th April, 1891... | 2,424,705 | | | | | | | |
| 1891..... | 2,424,705 | 54,443 | 150,490 | 14,048 | 1,531 | 208 | 549 | 1,020 |
| 1892..... | 2,424,705 | 54,536 | 150,490 | 14,353 | 1,403 | 198 | 691 | 999 |
| 1893..... | 2,424,705 | 58,955 | | 13,046 | 1,266 | 177 | 570 | 677 |
| 1894..... | 2,424,705 | ² 49,305 | 150,490 | 11,901 | 1,009 | 151 | 697 | 998 |
| 1895..... | 2,424,705 | 51,451 | | | 421 | 179 | 274 | 682 |
| 1896..... | 2,511,629 | 47,929 | 188,941 | 10,363 | 444 | 190 | 262 | 656 |
| 1897..... | 2,511,629 | 46,988 | 156,494 | 10,528 | 298 | 65 | 249 | 821 |
| 1898..... | 2,511,629 | 49,574 | 156,494 | 11,671 | 259 | 138 | 256 | 876 |
| 1899..... | 2,511,629 | 50,511 | | | 336 | 196 | 754 | 901 |
| 1900..... | 2,511,629 | 51,725 | | 8,966 | 294 | 172 | 912 | 854 |
| 1901..... | 2,660,494 | 50,195 | | 10,237 | 628 | 118 | 363 | 578 |
| 1902..... | 2,660,559 | 49,275 | 196,494 | | 529 | 64 | 17 | 625 |
| 1903..... | 2,660,559 | 46,557 | | | 396 | 135 | 280 | 441 |
| 1904..... | 2,660,559 | 47,854 | 170,694 | 8,953 | 250 | 78 | 334 | 564 |
| 1905..... | | | | | | | | |

¹ Estimated, 1891.² Inhabitants of Paris only.

Table XXIV. — Vienna, Austria.

| YEARS. | Population. | Total Deaths. | Population of Children under 5 years of age. | Deaths of Children under 5 years of age. | Deaths from Diphtheria and Croup. | Deaths from Scarlatina. | Deaths from Typhoid Fever. | Deaths from Measles. |
|-----------|-------------|---------------|--|--|-----------------------------------|-------------------------|----------------------------|----------------------|
| 1880..... | 721,016 | 20,453 | 58,023 | 8,219 | 597 | 172 | 171 | 98 |
| 1881..... | 741,308 | 21,549 | ..... | 8,224 | 589 | 286 | 171 | 106 |
| 1882..... | 749,919 | 21,595 | ..... | 8,903 | 522 | 410 | 187 | 203 |
| 1883..... | 750,762 | 21,194 | ..... | 7,930 | 360 | 150 | 157 | 246 |
| 1884..... | 759,649 | 20,353 | ..... | 7,688 | 342 | 130 | 95 | 344 |
| 1885..... | 769,889 | 21,976 | ..... | 8,668 | 464 | 83 | 106 | 289 |
| 1886..... | 780,066 | 20,869 | ..... | 8,114 | 546 | 124 | 85 | 338 |
| 1887..... | 790,381 | 20,549 | ..... | 9,812 | 455 | 391 | 80 | 493 |
| 1888..... | 800,836 | 20,349 | ..... | 7,547 | 521 | 230 | 107 | 253 |
| 1889..... | 811,434 | 20,106 | ..... | 7,624 | 513 | 139 | 103 | 364 |
| 1890..... | 822,176 | 20,324 | 69,710 | 7,853 | 536 | 92 | 77 | 459 |
| 1891..... | 1,378,530 | 34,479 | 130,808 | 15,610 | 1,311 | 271 | 85 | 855 |
| 1892..... | 1,406,933 | 35,134 | ..... | 16,843 | 1,580 | 242 | 116 | 825 |
| 1893..... | 1,435,931 | 34,515 | 130,808 | 15,002 | 1,615 | 311 | 105 | 1,225 |
| 1894..... | 1,465,637 | 33,994 | 140,545 | 15,073 | 1,679 | 413 | 74 | 898 |
| 1895..... | 1,495,764 | 34,879 | ..... | 15,021 | 710 | 437 | 86 | 754 |
| 1896..... | 1,526,623 | 34,132 | ..... | 14,685 | 621 | 436 | 79 | 930 |
| 1897..... | 1,551,129 | 33,187 | ..... | 13,946 | 575 | 236 | 84 | 857 |
| 1898..... | 1,590,295 | 32,356 | ..... | 13,593 | 520 | 227 | 93 | 794 |
| 1899..... | 1,623,134 | 33,333 | ..... | ..... | 463 | 261 | 66 | 684 |
| 1900..... | 1,656,662 | 34,303 | 160,233 | 13,650 | 306 | 168 | 137 | 741 |
| 1901..... | 1,691,996 | 33,502 | ..... | 12,476 | 387 | 367 | 76 | 634 |
| 1902..... | 1,726,604 | 33,857 | ..... | 13,399 | 438 | 277 | 51 | 769 |
| 1903..... | 1,744,177 | 33,172 | ..... | ..... | 426 | 232 | 68 | 378 |
| 1904..... | 1,797,992 | 32,931 | ..... | 12,270 | 386 | 65 | 60 | 1,021 |
| 1905..... | 1,897,630 | 36,671 | 213,884 | 13,282 | 458 | 181 | 83 | 587 |

Table XXV.—Glasgow, Scotland.

| YEARS. | Population. | Total Deaths. | Population of Children under 5 years of age. | Deaths of Children under 5 years of age. | Deaths from Diphtheria. | Deaths from Scarlatina. | Deaths from Typhoid Fever. | Deaths from Measles. |
|------------------|-------------|---------------|--|--|-------------------------|-------------------------|----------------------------|----------------------|
| 1880..... | ..... | 13,303 | ..... | 6,071 | 150 | 453 | 278 | 331 |
| 1881 census..... | 511,415 | 12,909 | 69,931 | 5,383 | 162 | 256 | 166 | 333 |
| 1882..... | ..... | 12,965 | ..... | 5,972 | 177 | 263 | 162 | 213 |
| 1883..... | ..... | 14,476 | ..... | 6,494 | 132 | 449 | 167 | 605 |
| 1884..... | ..... | 13,839 | ..... | 6,174 | 157 | 412 | 184 | 335 |
| 1885..... | ..... | 13,444 | ..... | 6,156 | 112 | 288 | 102 | 430 |
| 1886..... | ..... | 13,053 | ..... | 5,601 | 111 | 345 | 81 | 90 |
| 1887..... | ..... | 12,055 | ..... | 5,367 | 174 | 234 | 100 | 302 |
| 1888..... | ..... | 11,533 | ..... | 4,743 | 168 | 163 | 59 | 205 |
| 1889..... | ..... | 12,890 | ..... | 5,970 | 167 | 109 | 111 | 594 |
| 1890..... | ..... | 13,222 | ..... | 5,768 | 139 | 124 | 108 | 583 |
| 1891 census..... | 565,710 | 14,149 | 72,481 | 5,432 | 131 | 201 | 123 | 400 |
| 1892..... | 669,059 | 15,128 | 84,860 | 6,306 | 162 | 304 | 102 | 781 |
| 1893..... | 677,883 | 15,798 | 85,968 | 6,953 | 208 | 263 | 120 | 855 |
| 1894..... | 686,820 | 13,674 | 87,103 | 5,326 | 245 | 204 | 160 | 250 |
| 1895..... | 695,876 | 16,332 | 88,250 | 6,458 | 112 | 180 | 121 | 330 |
| 1896..... | 705,052 | 14,388 | 89,413 | 6,153 | 83 | 139 | 139 | 814 |
| 1897..... | 714,419 | 15,727 | 90,665 | 6,750 | 97 | 132 | 172 | 574 |
| 1898..... | 724,349 | 15,333 | 91,861 | 6,530 | 103 | 188 | 223 | 536 |
| 1899..... | 733,903 | 15,828 | 93,073 | 6,196 | 106 | 202 | 179 | 546 |
| 1900..... | 755,730 | 15,924 | ..... | 6,487 | 125 | 210 | 158 | 461 |
| 1901..... | 761,712 | ..... | ..... | ..... | 123 | 131 | 210 | 499 |
| 1902..... | 775,601 | 15,054 | ..... | ..... | 127 | 113 | 110 | 266 |
| 1903..... | 786,897 | 14,483 | ..... | 5,816 | 118 | 82 | 142 | 346 |
| 1904..... | 798,357 | 14,794 | 95,164 | 5,913 | 91 | 69 | 84 | 328 |
| 1905..... | 809,986 | 13,758 | ..... | 5,502 | 107 | 35 | 53 | 551 |

Table XXVI. — Liverpool, England.

| YEARS. | Population. | Total Deaths. | Population of Children under 5 years of age. | Deaths of Children under 5 years of age. | Deaths from Diphtheria. | Deaths from Scarlatina. | Deaths from Typhoid Fever. | Deaths from Measles. |
|-----------|-------------|---------------|--|--|-------------------------|-------------------------|----------------------------|----------------------|
| 1884..... | 541,081 | 14,382 | ..... | 6,908 | 80 | 197 | 112 | 611 |
| 1885..... | 537,548 | 13,764 | ..... | 6,213 | 133 | 190 | 96 | 716 |
| 1886..... | 534,088 | 13,919 | ..... | 6,182 | 125 | 277 | 140 | 273 |
| 1887..... | 530,649 | 14,006 | ..... | 6,218 | 96 | 321 | 130 | 661 |
| 1888..... | 527,533 | 12,159 | ..... | 5,070 | 66 | 187 | 125 | 331 |
| 1889..... | 523,838 | 13,047 | ..... | 5,921 | 57 | 352 | 167 | 485 |
| 1890..... | 520,466 | 14,298 | ..... | 6,319 | 104 | 577 | 99 | 535 |
| 1891..... | 517,145 | 13,911 | ..... | 5,697 | 63 | 119 | 92 | 320 |
| 1892..... | 513,318 | 12,671 | ..... | 5,322 | 47 | 131 | 111 | 456 |
| 1893..... | 510,514 | 13,919 | ..... | 6,035 | 47 | 231 | 221 | 273 |
| 1894..... | 507,330 | 12,073 | 64,544 | 5,214 | 65 | 232 | 248 | 299 |
| 1895..... | 638,291 | 16,215 | 78,411 | 7,201 | 97 | 168 | 192 | 397 |
| 1896..... | 632,512 | 14,617 | ..... | ..... | 157 | 227 | 206 | 306 |
| 1897..... | 644,129 | 15,290 | 78,411 | 6,972 | 91 | 209 | 145 | 344 |
| 1898..... | 668,645 | 15,380 | ..... | 6,489 | 123 | 145 | 143 | 283 |
| 1899..... | 668,645 | 16,269 | 83,042 | 7,039 | 189 | 164 | 174 | 320 |
| 1900..... | 668,645 | 16,393 | 83,042 | 6,417 | 143 | 113 | 120 | 150 |
| 1901..... | 686,322 | 15,493 | 85,238 | 6,473 | 158 | 192 | 154 | 472 |
| 1902..... | 710,337 | 15,392 | 85,885 | 6,378 | 222 | 318 | 190 | 334 |
| 1903..... | 716,810 | 14,210 | 85,885 | 5,786 | 165 | 201 | 108 | 132 |
| 1904..... | 723,430 | 15,351 | 88,475 | 7,626 | 181 | 149 | 82 | 696 |
| 1905..... | 730,143 | 14,050 | 89,296 | 5,726 | 151 | 298 | 47 | 239 |

Table XVII. — Berlin, Germany.

| YEARS. | Population. | Total Deaths. ¹ | Population of Children under 5 years of age. | Deaths of Children under 5 years of age. | Deaths from Diphtheria. | Deaths from Scarlatina. | Deaths from Typhoid Fever. | Deaths from Measles. |
|-----------------|------------------------|----------------------------|--|--|-------------------------|-------------------------|----------------------------|----------------------|
| Beginning | 1,089,070 | ..... | 142,476 | | | | | |
| 1880..... | | 32,823 | ..... | 19,249 | 1,198 | 872 | 527 | 376 |
| End..... | 1,123,749 | ..... | 183,060 | | | | | |
| 1881..... | | 31,055 | ..... | 17,483 | 1,593 | 903 | 352 | 201 |
| End..... | 1,156,539 | ..... | 148,828 | | | | | |
| 1882..... | | 30,465 | ..... | 16,990 | 1,914 | 604 | 357 | 144 |
| End..... | 1,196,205 | ..... | 146,138 | | | | | |
| 1883..... | | 35,056 | ..... | 19,902 | 2,651 | 867 | 222 | 1,173 |
| End..... | 1,232,716 | ..... | 144,464 | | | | | |
| 1884..... | | 32,933 | ..... | 18,440 | 2,446 | 395 | 243 | 295 |
| End..... | 1,271,677 | ..... | 144,620 | | | | | |
| 1885..... | | 31,483 | ..... | 15,558 | 1,816 | 409 | 214 | 406 |
| End..... | 1,315,656 | ..... | 146,227 | | | | | |
| 1886..... | | 34,293 | ..... | 19,215 | 1,535 | 271 | 181 | 565 |
| End..... | 1,363,031 | ..... |  |  |  |  |  |  |
| 1887..... | | 30,336 | ..... | 15,777 | 1,305 | 257 | 198 | 223 |
| End..... | 1,415,269 | ..... |  |  |  |  |  |  |
| 1888..... | | 29,296 | ..... | 15,076 | 1,018 | 201 | 188 | 364 |
| End..... | 1,472,151 | ..... |  |  |  |  |  |  |
| 1889..... | | 34,460 | ..... | 18,394 | 1,189 | 244 | 290 | 201 |
| End..... | 1,528,721 | ..... |  |  |  |  |  |  |
| 1890..... | ¹ 1,579,524 | 33,393 | ² 164,370 | 17,630 | 1,492 | 298 | 143 | 441 |
| End..... | 1 | ..... | 2 | | | | | |
| 1891..... | 1,601,527 | ..... | ..... | 16,800 | 1,010 | 150 | 166 | 130 |
| 1892..... | 1,666,715 | 32,696 | 172,378 | 16,819 | 1,325 | 53 | 137 | 217 |
| 1893..... | 1,714,938 | 36,032 | ..... | ..... | 1,578 | 582 | 161 | 341 |
| 1894..... | 1,655,235 | 30,961 | 176,300 | 14,649 | 1,361 | 443 | 69 | 203 |
| 1895..... | 1,677,304 | 33,627 | 164,258 | 16,034 | 984 | 817 | 95 | 175 |
| 1896..... | 1,695,313 | 30,578 | ..... | 13,443 | 515 | 333 | 80 | 111 |
| 1897..... | 1,758,885 | 30,622 | 58,339 | 13,825 | 507 | 217 | 71 | 161 |
| 1898..... | 1,805,054 | 30,571 | 56,751 | 13,595 | 608 | 268 | 78 | 119 |
| 1899..... | 1,817,952 | 34,011 | 166,888 | 14,878 | 609 | 525 | 74 | 530 |
| 1900..... | 1,864,203 | 35,409 | ..... | 15,498 | 534 | 502 | 109 | 195 |

¹ Census of December 1, 1890.² Excluded: Still-born, 1,749, 1,771, 1,759, 1,707, 1,778, 1,848, 1,710, 1,761, 1,756, 1,789, 1,473.

Table XVII. — *Continued.*

| YEARS. | Population. | Total Deaths. | Population of Children under 5 years of age. | Deaths of Children under 5 years of age. | Deaths from Diphtheria. | Deaths from Scarlatina. | Deaths from Typhoid Fever. | Deaths from Measles. |
|-----------|-------------|---------------|--|--|-------------------------|-------------------------|----------------------------|----------------------|
| 1901..... | 1,891,900 | 34,091 | ..... | 14,869 | 469 | 492 | 88 | 174 |
| 1902..... | 1,920,459 | 30,737 | ..... | 11,724 | 205 | 272 | 52 | 373 |
| 1903..... | 1,955,875 | 31,879 | ..... | 12,254 | 218 | 331 | 63 | 341 |
| 1904..... | 2,040,455 | 31,557 | ..... | ..... | 339 | 414 | 75 | 412 |
| 1905..... | 2,006,850 | 34,450 | 178,573 | 13,240 | 370 | 428 | ..... | 418 |

REMOVAL OF BODIES.

During the year permits were given for the removal of 414 bodies, chiefly from one cemetery to another.

STILL-BIRTHS.

In living births a larger proportion of males than females is born each year. In still-births the proportion is vastly larger. The still-born males in the City of Boston for the year 1905 were in the ratio of 142 to 100 females. The appended table, XXVIII., shows that there has been a steady decreasing ratio of the still-births to the total births for a period of twenty years, except from 1900-05, inclusive.

Table XXVIII.—Still-births by Months with Percentages to Total Births and Ratio to 1,000 Inhabitants for Twenty Years.

| | January. | February. | March. | April. | May. | June. | July. | August. | September. | October. | November. | December. | Total. | *Total Num. ber of Liv- ing Births. | Percentage to Total Births. | Ratio to 1,000 Inhabitants. |
|--------------|----------|-----------|--------|--------|-------|-------|-------|---------|------------|----------|-----------|-----------|--------|---|--------------------------------|--------------------------------|
| 1886..... | 38 | 37 | 46 | 62 | 35 | 38 | 46 | 63 | 43 | 38 | 48 | 49 | 543 | 11,990 | 4.33 | 1.35 |
| 1887..... | 45 | 54 | 40 | 45 | 36 | 44 | 34 | 57 | 37 | 43 | 48 | 48 | 534 | 12,137 | 4.21 | 1.33 |
| 1888..... | 48 | 48 | 38 | 34 | 52 | 56 | 48 | 40 | 55 | 38 | 48 | 47 | 532 | 12,613 | 4.19 | 1.33 |
| 1889..... | 43 | 51 | 49 | 54 | 61 | 59 | 46 | 50 | 46 | 51 | 44 | 44 | 598 | 12,787 | 4.47 | 1.42 |
| 1890..... | 53 | 40 | 52 | 58 | 49 | 42 | 51 | 49 | 54 | 50 | 68 | 59 | 627 | 13,289 | 4.50 | 1.39 |
| 1891..... | 46 | 47 | 58 | 48 | 55 | 51 | 56 | 49 | 40 | 50 | 57 | 57 | 614 | 13,967 | 4.21 | 1.33 |
| 1892..... | 44 | 48 | 51 | 57 | 60 | 58 | 51 | 55 | 44 | 54 | 57 | 54 | 633 | 15,154 | 4.01 | 1.34 |
| 1893..... | 54 | 49 | 52 | 59 | 42 | 41 | 51 | 57 | 51 | 38 | 50 | 61 | 605 | 14,602 | 3.98 | 1.24 |
| 1894..... | 56 | 56 | 60 | 50 | 69 | 59 | 49 | 45 | 52 | 72 | 65 | 44 | 700 | 15,401 | 4.35 | 1.39 |
| 1895..... | 38 | 47 | 52 | 62 | 41 | 58 | 56 | 63 | 50 | 39 | 51 | 50 | 607 | 15,613 | 3.74 | 1.21 |
| 1896..... | 52 | 51 | 61 | 46 | 44 | 57 | 51 | 62 | 50 | 51 | 58 | 59 | 648 | 16,484 | 3.71 | 1.25 |
| 1897..... | 53 | 55 | 51 | 55 | 62 | 43 | 42 | 46 | 58 | 52 | 40 | 48 | 614 | 16,973 | 3.49 | 1.16 |
| 1898..... | 50 | 48 | 49 | 51 | 56 | 45 | 55 | 36 | 54 | 49 | 52 | 58 | 613 | 16,980 | 3.54 | 1.13 |
| 1899..... | 46 | 60 | 41 | 43 | 45 | 52 | 41 | 43 | 35 | 37 | 56 | 39 | 539 | 16,247 | 3.21 | .97 |
| 1900..... | 51 | 36 | 63 | 53 | 47 | 41 | 49 | 46 | 42 | 57 | 41 | 47 | 573 | 16,420 | 3.36 | 1.02 |
| 1901..... | 42 | 50 | 45 | 42 | 56 | 46 | 40 | 55 | 44 | 58 | 37 | 61 | 576 | 16,580 | 3.56 | 1.01 |
| 1902..... | 51 | 50 | 45 | 56 | 37 | 59 | 39 | 66 | 55 | 42 | 50 | 63 | 623 | 15,549 | 3.85 | 1.06 |
| 1903..... | 58 | 51 | 51 | 53 | 61 | 60 | 53 | 54 | 51 | 55 | 44 | 44 | 635 | 15,701 | 3.89 | 1.09 |
| 1904..... | 53 | 53 | 62 | 50 | 66 | 60 | 52 | 65 | 54 | 49 | 46 | 49 | 663 | 16,211 | 3.93 | 1.13 |
| 1905..... | 57 | 58 | 58 | 59 | 47 | 64 | 54 | 59 | 43 | 61 | 59 | 51 | 670 | 15,844 | 4.06 | 1.13 |
| Totals..... | 1,000 | 986 | 1,024 | 1,063 | 1,022 | 1,066 | 984 | 1,060 | 968 | 984 | 1,019 | 1,032 | 12,167 | 289,232 | | |
| Average..... | 50 | 49 | 51 | 53 | 51 | 53 | 48 | 53 | 48 | 49 | 51 | 52 | 608 | 14,962 | | |

* Taken from the records of the City Registrar.

Table XXIX. — Cremations in the United States, 1876-1905, Inclusive.

CREMATION.

For centuries the method of disposal of the dead was entombment and earth-burial. About a quarter of a century ago cremation of dead bodies was introduced, and this method is now gradually spreading among civilized nations, as will be seen by the following table.

In order to ascertain the annual increasing number of cremations, official inquiries were addressed to the superintendents of the different crematories in the United States and Europe.

| CREMATORIES. | Date estab- lished. | 1876 to 1883. | 1884. | 1885. | 1886. | 1887. | 1888. | 1889. | 1890. | 1891. | 1892. | 1893. | 1894. | 1895. | 1896. | 1897. | 1898. | 1899. | 1900. | 1901. | 1902. | 1903. | 1904. | 1905. |
|---|---------------------------|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| New York City (U. S. Crema- tion Co.). | 1885 | ..... | ..... | 9 | 77 | 67 | 83 | 106 | 160 | 187 | 186 | 232 | 243 | 286 | 330 | 331 | 466 | 528 | 602 | 654 | 647 | 720 | 841 | 845 |
| Buffalo, N. Y. | 1885 | ..... | ..... | 1 | 8 | 17 | 16 | 23 | 30 | 38 | 27 | 30 | 31 | 41 | 28 | 44 | 40 | 43 | 67 | 50 | 60 | 55 | 74 | 64 |
| Troy, N. Y. | 1890 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 4 | 10 | 14 | 15 | 12 | 10 | 18 | 14 | 13 | 20 | 16 | 19 | 23 | 20 | 20 | ..... |
| Swinburne Island, N. Y. | 1889 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 2 | ..... | 60 | 28 | 8 | 1 | 1 | 3 | 3 | 4 | 2 | 3 | 3 | 2 | 3 | 3 |
| Waterville, N. Y. | 1893 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1 | 1 | 6 | 5 | 4 | 4 | 6 | 10 | 1 | 6 | 1 | 5 |
| St. Louis, Mo. | 1888 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Philadelphia, Pa. | 1888 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| San Francisco, Cal. (Odd Fel- lows') | 1895 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Boston, Mass. | 1893 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Cincinnati, O. | 1887 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| San Francisco, Cal. (Cypress Lawn). | 1893 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Chicago, Ill. | 1893 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

| | | | | | | | | | | | | | | | | | | | | | | | | |
|---|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Los Angeles, Cal..... | 1887 | ... | ... | ... | ... | 7 | 5 | 12 | 17 | 29 | 41 | 37 | 38 | 37 | 37 | 34 | 59 | 52 | 52 | 66 | ... | 83 | 89 | 250 |
| Detroit, Mich..... | 1887 | ... | ... | ... | ... | 3 | 10 | 14 | 24 | 21 | 33 | 47 | 22 | 31 | 29 | 44 | 51 | 58 | 31 | 56 | 53 | 61 | 62 | 57 |
| Pittsburg, Pa..... | 1886 | ... | ... | ... | ... | 14 | 9 | 11 | 8 | 9 | 13 | 14 | 13 | 10 | 13 | 16 | 23 | 19 | 31 | 24 | 20 | 19 | 24 | 21 |
| Baltimore, Md..... | 1889 | ... | ... | ... | ... | ... | ... | 3 | 5 | 12 | 16 | 22 | 15 | 11 | 17 | 21 | 14 | 22 | 18 | 22 | 18 | 11 | 23 | 13 |
| Lancaster, Pa..... | 1884 | ... | ... | ... | ... | 3 | 36 | 14 | 13 | 6 | 1 | 3 | 5 | 2 | 1 | 1 | 2 | 4 | 2 | 2 | 5 | ... | 1 | ..... |
| Davenport, Ia..... | 1891 | ... | ... | ... | ... | ... | ... | ... | ... | 6 | 7 | 13 | 8 | 8 | 9 | 23 | 17 | 18 | 24 | 29 | 31 | 30 | 33 | 31 |
| Milwaukee, Wis..... | 1895 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 21 | 34 | 30 | 53 | 40 | 45 | 51 | 50 | 57 | 61 |
| Washington, D. C..... | 1896 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 25 | 38 | 25 | 24 | 33 | 32 | 42 | 17 | 39 |
| Pasadena, Cal..... | 1895 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 4 | 13 | 24 | 31 | 26 | 46 | 53 | 51 | 52 | 57 |
| Washington, Pa..... | 1876 | 25 | 13 | 1 | 1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1 | 1 | ... | ... | ... | ..... |
| St. Paul, Minn..... | 1897 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 2 | 11 | 32 | 17 | 20 | 20 | 16 | 14 | 21 |
| Fort Wayne, Ind..... | 1895 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 5 | 1 | 3 | 4 | 4 | 6 | 2 | 5 | 6 |
| Mt. Auburn, Mass. (Cam- bridge)..... | 1900 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Totals..... | ..... | 25 | 16 | 47 | 114 | 127 | 190 | 249 | 372 | 471 | 661 | 674 | 831 | 1,017 | 1,101 | 1,331 | 1,609 | 2,012 | 2,379 | 2,646 | 2,880 | 3,007 | 3,419 | 3,597 |

Table XXX.—Summary of Crematories and Cremations in Several European Cities.

| CREMATORIES. | to 1905. | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 1905. | 1904. | 1903. | 1902. | 1901. | 1900. | 1899. | 1898. | 1897. | 1896. | 1895. | 1894. | 1893. | 1892. | 1891. | 1890. | 1889. | 1888. | 1887. | 1886. | 1885. | 1884. | 1878. |
| Germany. | Gotha..... | 301 | 276 | 234 | 218 | 189 | 200 | 179 | 188 | 147 | 132 | 139 | 153 | 162 | 162 | 111 | 128 | 95 | 110 | 95 | 76 | 215 | |
| | Heidelberg..... | 155 | 146 | 164 | 104 | 146 | 151 | 125 | 105 | 96 | 91 | 79 | 50 | 57 | 3 | | | | | | | | |
| | Hamburg..... | 280 | 225 | 187 | 181 | 145 | 111 | 98 | 81 | 70 | 41 | 98 | 48 | 2 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |  |
| | Jena..... | 198 | 123 | 91 | 81 | 47 | 46 | | | | | | | | | | | | | | | | |
| | Offenbach | 142 | 118 | 128 | 82 | 110 | 5 | | | | | | | | | | | | | | | | |
| Total..... | 1,027 | 888 | 804 | 666 | 637 | 513 | 423 | 374 | 313 | 264 | 316 | 251 | 221 | 165 | 111 | 128 | 95 | 110 | 95 | 76 | 215 | | |
| England. | London (Woking)..... | 338 | 275 | 273 | 301 | 240 | 240 | 240 | 173 | 137 | 150 | 125 | 101 | 104 | 99 | 54 | 46 | 28 | 13 | 10 | 3 | | |
| | Manchester..... | 97 | 86 | 81 | 96 | 88 | 62 | 51 | 52 | 58 | 47 | 20 | 3 | 3 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |  |
| | Glasgow..... | 35 | 24 | 20 | 18 | 20 | 12 | 16 | 16 | 10 | 1 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |  |
| | Liverpool | 35 | 40 | 54 | 40 | 9 | 23 | 23 | 23 | 7 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |  |
| | Total..... | 514 | 418 | 430 | 414 | 384 | 337 | 263 | 208 | 208 | 209 | 172 | 121 | 107 | 94 | 54 | 46 | 28 | 13 | 10 | 3 | ..... |  |
| Sweden. | Stockholm..... | 49 | 48 | 46 | 54 | 54 | 49 | 54 | 54 | 47 | 31 | 42 | 51 | 41 | 48 | 27 | 46 | 23 | 13 | ..... | ..... | ..... |  |
| | Gottenberg..... | 21 | 18 | 20 | 16 | 16 | 21 | 24 | 19 | 14 | 3 | 7 | 12 | 11 | 9 | 11 | ..... | ..... | ..... | ..... | ..... | ..... |  |
| | Total..... | 67 | 67 | 66 | 70 | 62 | 75 | 73 | 73 | 61 | 34 | 49 | 63 | 52 | 57 | 38 | 46 | 23 | 13 | ..... | ..... | ..... |  |

| | | | | | | | | | | | | | | | | | |
|--------------|--------------------|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|-----|-----|-------|
| France. | { Paris | 749 | 3,388 | 3,741 | 3,974 | 3,911 | 3,992 | 4,180 | 4,423 | 4,197 | 4,513 | 4,554 | 5,825 | 310 | 300 | 270 | ..... |
| | Rouen | — | — | — | — | — | — | — | — | — | — | 5 | 4 | 1 | 6 | 7 | 4 |
| | Total | 749 | 3,388 | 3,741 | 3,974 | 3,911 | 3,992 | 4,180 | 4,423 | 4,197 | 4,513 | 4,559 | 5,829 | 311 | 306 | 277 | 4 |
| Switzerland. | { Zurich | 21 | 32 | 39 | 39 | 41 | 40 | 44 | 64 | 69 | 82 | 81 | 116 | 126 | 159 | 158 | 209 |
| | Basel | — | — | — | — | — | — | — | — | — | 17 | 14 | 20 | 17 | 30 | 30 | 36 |
| | Total | 21 | 32 | 39 | 39 | 41 | 40 | 44 | 64 | 69 | 99 | 95 | 136 | 143 | 189 | 188 | 245 |
| Denmark. | { Copenhagen | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
|  | ..... | — | — | — | — | 4 | 12 | 18 | 21 | 14 | 18 | 28 | 34 | 44 | 51 | 47 | 73 |

* Woking 143 and Golder's Green 158 (now called the London Cremation Co., Ltd.).

† The discrepancy is unexplainable.

‡ The Cremation Society of England (324 Regent St., London) has furnished the following information: Total number of cremations in Hull 83, Darlington 15, Leicester 30, Birmingham 41, Leeds 16, Ilford 9, Bradford 1 and Sheffield 7.

Table XXXI. — Summary of Cremations in Italian Cities.

| * CITIES. | Date of Inauguration. | 1876. | 1877. | 1878. | 1879. | 1880. | 1881. | 1882. | 1883. | 1884. | 1885. | 1886. | 1887. | 1888. | 1889. | 1890. | 1891. | 1892. | 1893. | 1894. | 1895. | 1896. | 1897. | 1898. | 1900. | 1901. | 1902. | 1903. | 1904. | 1905. | |
|-----------------|-----------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| ITALY. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Milan..... | 1876 | 2 | 9 | 14 | 25 | 40 | 70 | 67 | 44 | 61 | 70 | 61 | 55 | 76 | 85 | 72 | 65 | 66 | 74 | 72 | 64 | 66 | 104 | 92 | 99 | 92 | 107 | 107 | 92 | ..... |  |
| Lodi..... | 1877 | ..... | 6 | 2 | 2 | 5 | 5 | 2 | 2 | 2 | 1 | 4 | 1 | 3 | 3 | 3 | 3 | 1 | 3 | ..... | 1 | ..... | ..... | ..... | ..... | 1 | ..... | ..... | ..... | ..... |  |
| Rome..... | 1883 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 15 | 29 | 43 | 32 | 33 | 59 | 90 | 74 | 47 | 75 | 55 | 61 | 54 | 49 | 37 | 29 | 55 | 52 | 23 | 61 | 65 | 66 | 71 |
| Cremona..... | " | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 4 | 15 | 5 | 25 | 9 | 10 | 10 | 5 | 8 | 4 | 3 | 4 | 7 | 3 | 3 | 2 | 3 | 6 | 3 | 1 | 4 | 4 | ..... |
| Brescia..... | " | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 5 | 2 | 2 | 5 | 4 | 3 | 2 | 2 | 4 | 1 | 1 | 3 | 2 | 1 | 3 | 3 | 3 | 2 | 1 | 3 | ..... | 3 | 5 |
| Iadue..... | 1884 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 4 | 5 | 5 | 4 | 7 | 5 | 6 | 4 | 3 | 8 | 3 | 4 | 2 | 3 | 4 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Udine..... | " | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 2 | 4 | 5 | ..... | 4 | 2 | 3 | 2 | 6 | 2 | 2 | 2 | 1 | 1 | 3 | 2 | 6 | 2 | ..... | 7 | 6 | 4 |
| Varese..... | " | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1 | 1 | 1 | 5 | ..... | 5 | ..... | 1 | 2 | 1 | ..... | 1 | 3 | 3 | 2 | 2 | ..... | ..... | ..... | ..... | ..... | ..... |
| Spezia..... | 1885 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1 | 2 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Novara..... | " | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1 | 2 | 2 | 1 | 3 | 1 | ..... | 7 | 1 | 3 | 1 | 1 | 1 | 2 | 4 | ..... | ..... | ..... | ..... | ..... | ..... |
| Florence..... | " | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 14 | 16 | 26 | 18 | 21 | 20 | 16 | 24 | 18 | 19 | 24 | 11 | 14 | 13 | 14 | 17 | 20 | 20 | 24 | 18 | 23 |
| Livorno..... | " | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 8 | 13 | 20 | 10 | 20 | 26 | 9 | 16 | 16 | 11 | 9 | 24 | 9 | 13 | 13 | 14 | 23 | 25 | 19 | ..... | ..... |
| Asti..... | " | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1 | ..... | 4 | 3 | 3 | 2 | 3 | 4 | ..... | 2 | ..... | 1 | ..... | 4 | ..... | 1 | ..... | ..... | ..... | ..... | ..... |
| Pisa..... | " | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 8 | 3 | 1 | 3 | 2 | 8 | 1 | 7 | 6 | 7 | 3 | 1 | 2 | 2 | 6 | 10 | ..... | ..... | ..... | ..... | ..... |
| Alexandria..... | 1886 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1 | ..... | 1 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Como..... | " | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 5 | 2 | 2 | 3 | 1 | 2 | 2 | ..... | 1 | 1 | 3 | 2 | 1 | 1 | ..... | 1 | ..... | 1 | ..... | ..... |
| Turin..... | 1887 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------|---------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| " | Mantua..... | 1 | 2 | 1 | 3 | 4 | 8 | 3 | 4 | .... | 3 | 2 | 4 | 1 | 5 | 4 | 3 | 8 | | | | | | | | | | | | | |
| 1888 | St. Remo..... | .... | 5 | 10 | 10 | 9 | 9 | 9 | 4 | 7 | 5 | 5 | 11 | 6 | 10 | 4 | 8 | .... |  |  |  |  |  |  |  |  |  |  |  |  |  |
| " | Verona..... | .... | 3 | 2 | 2 | 2 | 1 | .... | 3 | 1 | .... | 3 | 1 | 1 | 1 | 2 | 1 | .... |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1889 | Bologna..... | .... | .... | 2 | 10 | 12 | 5 | 11 | 3 | 11 | 14 | 20 | 19 | 26 | 22 | 21 | 26 | 26 | | | | | | | | | | | | | |
| 1890 | Modeno..... | .... | .... | .... | 2 | 1 | 4 | 1 | 2 | 3 | 3 | .... | 3 | 1 | 4 | 5 | 1 | 8 | | | | | | | | | | | | | |
| 1891 | Venice..... | .... | .... | .... | .... | 1 | 7 | 5 | 5 | 3 | 7 | 4 | 2 | 7 | 3 | 8 | 8 | .... |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1894 | Spoletto..... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 2 | | | | | | | | | | | | | |
| 1895 | Perugia..... | .... | .... | .... | .... | .... | .... | .... | .... | 6 | 4 | 2 | 2 | 3 | 4 | .... | .... | .... |  |  |  |  |  |  |  |  |  |  |  |  |  |
| " | Sienna..... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 8 | 2 | 1 | .... | .... | .... | 2 | 8 | | | | | | | | | | | | | |
| 1897 | Bera..... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 1 | .... | 1 | .... | .... | .... | .... |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Total..... | | 2 | 15 | 16 | 27 | 45 | 75 | 69 | 70 | 116 | 164 | 180 | 168 | 227 | 282 | 238 | 231 | 262 | 246 | 228 | 220 | 219 | 242 | 241 | 265 | 262 | 255 | 276 | 332 | 168 | 151 |

*Dott Lodovico Forresti Statistica delle Cremazioni eseguita in Europa Nel Secolo XIX., 1876-1900. Edito a cura della Società di Cremazioni in Bologna.

Table XXXII. — Supplemental Summary of Crematories and Cremations in United States and Other Foreign Cities.

| CREMATORIES. | 1878. | 1879. | 1880. | 1881. | 1882. | 1883. | 1884. | 1885. | 1886. | 1887. | 1888. | 1889. | 1890. | 1891. | 1892. | 1893. | 1894. | 1895. | 1896. | 1897. | 1898. | 1899. | 1900. | 1901. | 1902. | 1903. | 1904. | 1905. |
|------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Denver, Col..... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 48 | 61 |
| Oakland, Cal..... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 352 | 456 |
| Cleveland, Ohio..... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 63 | 65 |
| Montreal, B. P..... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 5 | 17 |
| Eisenach, Germany..... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 17 | 43 |
| Karlsruhe "..... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 46 | 94 |
| Mannheim "..... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 74 | 110 |
| Mainz "..... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 90 | 156 |
| Total..... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 56 | 805 |
| | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1,078 |

Table XXXIII. — Comparative Death-rates per 10,000 Inhabitants from Pulmonary Tuberculosis in some American and Foreign Cities for Ten Years, 1896-1905, Inclusive.*

| YEARS. | Boston, Mass. | Philadelphia, Pa. | New York N.Y. (old city). | Chicago, Ill. | Brooklyn, N.Y. (old city). | St. Louis, Mo. | London, Eng. | Paris, France. | Berlin, Germany. | Vienna, Austria. | Glasgow, Scotland. | Liverpool, England. |
|-----------|------------------|----------------------|------------------------------|------------------|-------------------------------|-------------------|-----------------|-------------------|---------------------|---------------------|-----------------------|------------------------|
| 1896..... | 25.72 | 21.15 | 26.30 | 14.27 | 21.89 | 18.00 | 17.59 | 38.88 | 23.35 | 41.60 | 19.03 | 18.94 |
| 1897..... | 24.37 | 19.66 | 24.95 | 13.41 | 20.40 | 16.61 | 17.62 | 37.02 | 21.94 | 39.31 | 19.86 | 18.94 |
| 1898..... | 22.90 | 20.88 | 25.08 | 14.64 | 21.86 | 16.07 | 17.68 | 38.43 | 20.99 | 36.40 | 19.38 | 18.08 |
| 1899..... | 22.27 | 22.23 | 26.00 | 12.90 | 21.51 | 17.04 | 18.88 | 39.40 | 22.42 | 38.67 | 19.67 | 19.64 |
| 1900..... | 25.08 | 21.00 | 25.69 | 15.30 | 20.90 | 17.49 | 17.50 | 40.10 | 24.52 | 38.46 | 19.08 | 19.25 |
| 1901..... | 23.71 | 22.29 | 24.97 | 14.19 | 20.46 | 18.86 | 18.18 | 40.51 | 21.83 | 36.23 | 18.55 | 18.97 |
| 1902..... | 21.70 | 21.07 | 22.87 | 14.04 | 18.78 | 18.21 | 16.64 | 42.55 | 20.41 | 34.40 | 16.72 | 18.93 |
| 1903..... | 21.10 | 22.14 | 24.07 | 14.26 | 18.55 | 17.46 | 15.92 | 38.93 | 19.31 | 34.14 | 15.82 | 17.55 |
| 1904..... | 21.76 | 22.06 | 24.66 | 16.20 | 19.73 | 19.39 | 16.55 | 38.38 | 19.36 | 31.44 | 16.17 | 17.72 |
| 1905..... | 20.56 | 19.73 | 23.75 | 16.09 | 17.76 | 18.35 | 14.53 | ..... | 21.49 | 33.32 | 13.94 | 15.38 |

* The death-rates were calculated on the official figures sent from the above cities.

SMOKE NUISANCE.

The smoke nuisance in Boston having grown to such proportions in the last few years as to become a source of general discomfort and complaint, the subject was taken in hand by a few public-spirited citizens, who asked for relief by the Legislature of 1902. Being defeated in 1902, and again in 1903, a third appeal was made in 1905. At this time an act was passed which differs somewhat from the old smoke law, places its enforcement upon the Board of Health, and reads as follows :

[CHAP. 418.]

AN ACT TO PROVIDE FOR THE ABATEMENT OF SMOKE IN THE CITY
OF BOSTON.

Be it enacted, etc., as follows :

SECTION 1. In the city of Boston dark smoke or dense gray smoke shall not be discharged or allowed to escape from any building or premises, except locomotive engines and plants furnishing power for public service corporations and plants burning wood exclusively, for more than six minutes in any one hour of the day or night, except under a permit, as hereinafter provided.

SECTION 2. The board of health of the city of Boston shall be charged with the enforcement of this act in said city.

SECTION 3. Whoever violates the provisions of section one, or in any way participates in the violation thereof, may be punished by a fine of not more than one hundred dollars for each week during any part of which said section is violated. The board of health of said city shall be notified of every complaint and shall be given at least twenty-four hours' notice of the time of the trial thereon.

SECTION 4. The board of health of the city of Boston may apply to the supreme judicial court or to the superior court, or any justice thereof, for an injunction to restrain the further operation of any furnace, engine, steam boiler or boilers, which are being operated in said city in such a manner as to violate the provisions of section one, and said court of justice may, after hearing the parties, enjoin the continuance of such violation.

SECTION 5. Temporary permits for the production and emission of smoke, covering periods not exceeding six months from January first, nineteen hundred and six, may be granted by the board of health of said city to persons duly applying for the same and satisfying the Board that the applicant will, during the period of such temporary permit, make changes or improvements to prevent the violation of the provisions of section one.

SECTION 6. This act shall take effect on the first day of January in the year nineteen hundred and six.—[*Approved May 18, 1905.*]

In December, 1905, shortly before the law went into effect, the Board of Health distributed printed copies of the new law among those who were likely to make an excessive amount of smoke, and prefaced each by notice that the Board of Health would commence the enforcement of the new law on January 1, 1906. The department had seventeen sanitary inspectors in as many sanitary districts, into which the city is divided. Their daily inspections and observations in these districts were such as to render them easily available for the new duties without material hindrance to their general work. The Board knew them to be thoroughly competent and found them willing and ready to take on the new duties, under the instructions of the Board and the immediate supervision of the chief sanitary inspector. The new duties were assigned to said officers on January 1. These inspectors are instructed to make note of the exact time and extent of any violation of the smoke law, to carefully identify the chimney from which the smoke issues, without entering buildings, when it can be avoided, and to neglect all talk about particular "smoke-consuming" devices and fuel.

During the month of January, which closes the date for our annual report, the inspectors reported violations of the law in one hundred and seventy-four different places. Notices in all cases were sent by the Board and responses made by representatives of the several hotels, stores, factories, office buildings, schools, colleges and various industries. Conferences between the Board of Health and the business men who have responded to these notices have resulted most satisfactorily, with a full understanding of the import of the law, the prospect of its being enforced, and a mutual desire to see the smoke nuisance abated. A very general request is being made, under the permit clause of the law, for time in which to make constructive alterations or other changes by which the amount of smoke can be reduced, to comply with the law. In many instances no material alterations will be necessary to keep within the requirements, except that of securing proper and faithful stoking. In no instance has the Board of Health recommended any special device or kind of coal as a remedy. It has, however, emphasized the importance of sufficient boiler capacity and intelligent stoking as the primal means not only for reducing the amount of smoke to the legal limit, but for reducing the fuel expense and the demand for special additional apparatus. The most economical and successful use of soft coal and other rapidly burning fuels

require special engineering skill in the construction, setting and care of boilers and furnaces. Poor construction and careless firing means waste of fuel in dense smoke with corresponding discomfort and damage to the community. That an incomplete plant may be patched and reinforced with additional power for better combustion is admitted, but the skilled engineer and stoker are still the indispensable factors in the prevention of excessive smoke.

It has been found necessary to prosecute but one case, and that was placed on file on the plea of guilty, and assurances that the infraction would not be repeated.

There has been a marked decrease in the amount of smoke during the month of January except from sources which are exempt by the law, and it is confidently expected that a progressive decrease in the amount of smoke to the lawful limit will be seen from now on, and probably without many prosecutions.

It is to be seriously regretted that "locomotive engines and plants furnishing power for public service corporations and plants burning wood exclusively" should have been exempted from the operation of this law. It is manifestly unfair to deny one business man, firm or corporation the right to damage the public health, comfort and property values by needless volumes of smoke, and at the same time allow others to do the same thing, under the same circumstances and having equal or greater advantages with which to refrain from causing such discomfort and damage. The business man who has done his part to stop the smoke nuisance in Boston, and then finds his own and other homes and business still being needlessly discomfited and damaged by the smoke of his exempted neighbor, is not easily placated.

There is no apparent reason why the requirements of this law, already shown to be both wise and reasonable, should not be made to bear equally upon all.

DUMPS FOR CITY REFUSE.

The prevailing custom of filling in low lands and driving back the sea and inland waters with decomposing city waste is as old as the city, and as annoying and wanting in defence, from a sanitary point of view, as it is old. In a business sense, the dump must be regarded as a bed of decaying matter which ultimately stands only for the amount of ash and other solids to which it will be slowly reduced by decomposition. Meanwhile it is a most unpleasant spectacle, an unwholesome and unwelcome neighbor, and a source of common

complaint. The Board begs to revert to its repeated recommendations that the Mayor and City Council carefully consider the question of establishing a series of crematories, of moderate expense, in suitable parts of the city, including Fort Hill wharf for the treatment of the city wastes, including ashes, general refuse and garbage, which the Board of Health believes can be so treated without offence to the several neighborhoods, and with economy and credit to the city.

MEDICAL INSPECTION OF SCHOOLS.

It is now nearly twelve years since this work was begun in Boston. During this time such inspection has been adopted in most of the larger and in many of the smaller cities and towns of this country. The system and extent of inspection differs considerably in different cities, though the main features are the same as those adopted in Boston in 1894. In some instances the inspection has been carried to a much greater extent and a higher degree of efficiency than in the city where it was first introduced. For some years the Board of Health has asked permission to increase the amount of inspection in our schools, to improve the present incomplete surveillance over the pupils and others while suffering from infectious diseases at home, to guard the return to school of pupils convalescing from infectious or unreported diseases, to point out more of the existing physical and mental defects among the school children, by which they are more or less incapacitated for their work, and for which relief might be found, and thus render greater service to the schools and the public. This additional service can be secured for a moderate increase of expense, which can be met within our present appropriation on the approval of His Honor the Mayor.

The following is a list of the diseases found in the schools during the year 1905:

I. — SPECIFIC INFECTIOUS DISEASES.

| | |
|----------------------|-----|
| Diphtheria | 1 |
| Scarlet fever | 9 |
| Measles | 16 |
| Whooping-cough | 19 |
| Mumps | 170 |
| Chickenpox | 53 |
| Influenza | 29 |
| Syphilis | 1 |
| Tuberculosis | 12 |
| Erysipelas | 2 |

II. — DISEASES OF THE ORAL AND RESPIRATORY TRACT.

1. Mouth.

| | |
|----------------------------|----|
| Stomatitis: | |
| (a) Simple (erythematous), | 5 |
| (b) Aphthous herpetic ... | 1 |
| (c) Ulceration | 1 |
| Alveolar abscess | 20 |

2. Pharynx.

| | |
|--|-----|
| Acute pharyngitis | 144 |
| Hypertrophic pharyngitis (acute and chronic) ... | 43 |

3. Tonsils.

| | |
|---------------------------------|-----|
| Acute follicular tonsillitis .. | 277 |
| Hypertrophic tonsillitis | 432 |
| Abscess | 10 |

4. Uvula.

| | |
|------------------|---|
| Elongation | 4 |
|------------------|---|

5. Nose.

| | |
|----------------------------|----|
| Acute rhinitis | 41 |
| Chronic rhinitis | 3 |
| Purulent rhinitis | 2 |
| Ozaena | 20 |
| Epistaxis | 7 |
| Deviations of septum | 4 |

6. Naso-Pharynx.

| | |
|---|-----|
| Naso-pharyngitis (post-nasal catarrh) | 22 |
| Adenoid disease | 199 |

7. Larynx.

| | |
|--------------------------|----|
| Acute laryngitis | 33 |
| Chronic laryngitis | 1 |

8. Bronchi.

| | |
|--------------------------|----|
| Acute bronchitis | 71 |
| Chronic bronchitis | 2 |

III. — DISEASES OF THE EAR.

| | |
|--|----|
| Foreign bodies (cerumen, etc.) | 6 |
| Otitis media, catarrhal, acute and chronic | 46 |
| Otitis media, suppurative, acute and chronic | 58 |
| Mastoiditis | 1 |
| Imperfect hearing (without visible cause) | 35 |

IV. — DISEASES OF THE EYE.

1. Foreign bodies

16

2. Eyelids.

| | |
|-------------------|-----|
| Blepharitis | 110 |
| Stye | 18 |
| Ptosis | 4 |
| Trichiasis | 2 |

3. Lachrymal Organs.

| | |
|---------------------------|---|
| Abscess | 1 |
| Obstruction of duct | 5 |

4. Conjunctiva.

| | |
|---------------------------|-----|
| Conjunctivitis: | |
| (a) Acute catarrhal | 258 |
| (b) Purulent | 1 |
| (c) Phlyctenular | 7 |
| (d) Granular | 33 |

5. Cornea.

| | |
|------------------------------|---|
| Interstitial keratitis | 1 |
| Ulcer | 8 |
| Opacity | 7 |

6. Iris.

| | |
|-----------------|---|
| Iritis | 2 |
| Synachiae | 2 |

7. Muscles.

| | |
|------------------|----|
| Strabismus | 21 |
| Nystagmus | 3 |

Imperfect sight (without visible cause)..... 154

V. — DISEASES OF THE SKIN.

| | |
|--------------------------|-------|
| Acne..... | 37 |
| Alopecia areata..... | 9 |
| Dermatitis..... | 52 |
| Eczema..... | 320 |
| Erythema multiforme..... | 3 |
| Erythema simplex..... | 16 |
| Furunculus..... | 38 |
| Herpes { simplex..... | 150 |
| { zoster..... | 23 |
| Impetigo contagiosa..... | 363 |
| Pediculosis..... | 2,878 |
| Pemphigus..... | 6 |
| Pruritus..... | 3 |
| Psoriasis..... | 14 |
| Scabies..... | 293 |
| Seborrhœa..... | 8 |
| Tinea { favosa..... | 6 |
| { trichophytina..... | 122 |
| { versicolor..... | 7 |
| Urticaria..... | 36 |
| Verruca..... | 6 |

VI. — MISCELLANEOUS DISEASES.

| | |
|--|-------|
| Anæmia..... | 73 |
| Debility..... | 78 |
| Headache..... | 70 |
| Cervical adenitis..... | 67 |
| Chorea..... | 26 |
| Ulcer..... | 16 |
| Deformities (spinal and ex- tremities)..... | 8 |
| Sprains..... | 16 |
| Contusions..... | 40 |
| Wounds..... | 114 |
| Abscess..... | 35 |
| Dental caries (painful)..... | 17 |
| Neuralgia..... | 10 |
| Epilepsy..... | 9 |
| Rheumatism..... | 14 |
| Cardiac diseases..... | 25 |
| Gastric diseases..... | 62 |
| Intestinal diseases..... | 10 |
| Urinary diseases..... | 11 |
| Vaccinations (performed)... | 415 |
| Certificates of vaccination.. | 2,309 |
| Unclassified..... | 76 |

SUMMARY.

| | |
|---|--------|
| Specific infectious diseases | 312 |
| Oral and respiratory diseases | 1,342 |
| Diseases of the ear | 146 |
| Diseases of the eye | 653 |
| Diseases of the skin | 4,390 |
| Miscellaneous diseases | 3,501 |
| Found free from disease | 6,617 |
| Total | 16,961 |

| | |
|--|--------|
| Number of pupils examined in the schools | 16,961 |
| Number recommended to be sent home | 2,744 |
| Number consultations with teachers (about pupils re- turning to school, etc.) | 2,222 |

MEDICAL INSPECTORS AND SCHOOLS.

Dist.

1. W. D. Kelly, M.D., 57 Hancock street, city (Tel. Hay. 606-4), Hancock Grammar and Eliot Grammar and their Primaries.
2. M. P. Smithwick, M.D., 2 Arlington street, city (Tel. B. B. 557), St. Mary's, St. Stephen's, St. Leonard, Sacred Heart Parochials, Moon-street Primary, Washington Grammar and Baldwin Primary.

Dist.

3. W. S. Boardman, M.D., 63 Mt. Vernon street, city (Tel. Hay. 2184), Bowdoin Grammar and Primaries.
4. C. Morton Smith, M.D., 437 Marlboro' street, city (Tel. B. B. 731), Prince Grammar and Primaries, and Horace Mann School for Deaf.
5. G. S. C. Badger, M.D., 485 Beacon street, city (Tel. B. B. 1128-2), Quincy Grammar and Winthrop Grammar and their Primaries.
6. J. L. Ames, M.D., 72 Chestnut street, city (Tel. Hay. 1188), Brimmer Grammar and Primaries and St. James' Parochial.
7. S. H. Ayer, M.D., 318 Shawmut avenue, city (Tel. Tre. 663), Franklin Grammar and Rice Grammar and their Primaries, Cathedral, Sanctuary Choir and Holy Trinity, German, Parochials.
8. T. C. Erb, M.D., 159 St. Botolph street, city (Tel. B. B. 1607), Dwight Grammar and Everett Grammar and their Primaries.
9. A. W. Fairbanks, M.D., 362 Commonwealth avenue, city (Tel. B. B. 84), Sherwin Grammar and Hyde Grammar and their Primaries, Cottage-place Kindergarten.
10. J. S. Brownrigg, M.D., 16 Delle avenue, Rox. (Tel. Rox. 258), Dudley and Dillaway Grammars and their Primaries, and St. Francis' Parochial.
11. H. J. Perry, M.D., 636 Beacon street, city (Tel. B. B. 996), Martin Grammar and Comins Grammar and their Primaries, Smith-street Parochial.
12. D. N. Blakeley, M.D., 255 Warren street, Rox. (Tel. Rox. 628-2), Dearborn Grammar and Primaries.
13. T. J. Murphy, M.D., 372 Dudley street, Rox. (Tel. Rox. 570), Hugh O'Brien Grammar and Primaries, St. Patrick's Parochial.
14. M. J. Cronin, M.D., 5 Elm Hill avenue, Rox. (Tel. Rox. 15), Lewis Grammar and Primaries, Roxbury High School and St. Joseph's Parochial.
15. J. E. Butler, M.D., 81 Westland avenue (Tel. B. B. 3143-3), Phillips Brooks Grammar and Primaries and St. John's Parochial.
16. J. C. D. Pigeon, M.D., 27 Elm Hill avenue, Rox. (Tel. Rox. 1236-2), George Putnam Grammar and Primaries and West Roxbury High School.
17. H. M. Emmons, M.D., 335 Centre street, J. P. (Tel. Jam. 356-3), Lowell Grammar and Primaries, Cheverus Parochial and Jefferson Grammar.

Dist.

18. J. S. H. Leard, M.D., 392 Arborway, J. P. (Tel. Jam. 417-3), Agassiz Grammar and Bowditch Grammar and their Primaries.
19. J. P. Broidrick, M.D., 777 Centre street, J. P. (Tel. Jam. 268-2), Charles Sumner and Primaries and Leo. XIII. Parochials.
20. H. B. Stevens, M.D., 79 Park street, W. R. (Tel. Jam. 657-2), Longfellow Grammar and Primaries.
21. F. C. Jillson, M.D., 11 Hastings street, W. R. (Tel. Jam. 270), Robert G. Shaw Grammar and Primaries.
22. J. T. Cutler, M.D., 20 Crawford street, Rox. (Tel. Rox. 1246-3), Edward Everett Grammar and Primaries and Harbor View-street Primary.
23. D. G. Eldridge, M.D., 15 Monadnock street, Dor. (Tel. Dor. 341-2), Mather Grammar and Primaries and St. Peter's Parochial.
24. A. B. Coffin, M.D., 10 Rosedale street, Dor. (Tel. Dor. 77-3), Christopher Gibson Grammar and Primaries.
25. R. M. Merrick, M.D., 15 Adams street, Dor. (Tel. Dor. 88-2), Mary Hemenway Grammar and Primaries.
26. J. M. Connolly, M.D., 183 Harvard street, Dor. (Tel. Dor. 816-2), Henry L. Pierce Grammar and Primaries and Dorchester High School.
27. J. S. Greene, M.D., 1107 Washington street, Dor. (Tel. Mil. 58-2), Roger Wolcott Grammar and Primaries.
28. W. H. Parker, M.D., 1773 Dorchester avenue, Dor. (Tel. Dor. 364), Gilbert Stuart Grammar and Primary.
29. F. J. Bailey, M.D., 338 Bowdoin street, Dor. (Tel. Dor. 235-3), Minot Grammar and Primaries.
30. H. F. R. Watts, M.D., 6 Monadnock street, Dor. (Tel. Dor. 16-2), John A. Andrew Grammar and William E. Russell Grammar and their Primaries, with the exception of the Harbor View-street Primary.
31. R. M. Cole, M.D., 456 Broadway, S. B. (Tel. S. B. 464-2), Shurtleff Grammar and Primaries and South Boston High School.
32. W. B. Bancroft, M.D., 597 Broadway, S. B. (Tel. S. B. 215-3), Thomas N. Hart Grammar and Primaries and Gate of Heaven Parochial, Lincoln Grammar, Choate Burnham Primary.
33. G. P. Morris, M.D., 702 Broadway, S. B. (Tel. S. B. 201-4), Gaston Grammar and Primaries, Oliver Hazard Perry Grammar, Tuckerman Primary, South Baptist Church School.

Dist.

34. J. H. Sherman, M.D., 534 Broadway, S. B. (Tel. S. B. 228-2), Bigelow Grammar and Primaries.
35. F. W. Stuart, M.D., 550 Broadway, S. B. (Tel. S. B. 210), Norcross Grammar and Primaries and St. Augustine Parochial.
36. F. J. Weller, M.D., 580 Broadway, S. B. (Tel. S. B. 270), Lawrence Grammar and Primaries and SS. Peter and Paul Parochial.
37. J. G. Dearborn, M.D., 2 Wood street, C. D. (Tel. C. D. 414), Harvard Grammar and Primaries and St. Mary's Parochial.
38. Francis Magurn, M.D., 112 Main street, C. D. (Tel. C. D. 278-4), Frothingham Grammar and Primaries.
39. J. B. Lyons, M.D., 1 Dexter row, C. D. (Tel. C. D. 325-3), Warren Grammar and Primaries.
40. W. J. McNally, M.D., 41 Monument square, C. D. (Tel. C. D. 492-2), Prescott Grammar and Primaries and Charlestown High School.
41. J. F. O'Brien, M.D., 401 Bunker Hill street, C. D. (Tel. C. D. 200), Bunker Hill Grammar and Primaries and St. Francis de Sales Parochial.
42. W. H. Ensworth, M.D., 40 Princeton street, E. B. (Tel. E. B. 219-2), Adams Grammar and Primaries and Boys' and Girls' Assumption Parochials.
43. E. F. O'Shea, M.D., 5 Chelsea street, E. B. (Tel. E. B. 259-3), Lyman Grammar and Primaries, East Boston High and Holy Redeemer Parochial.
44. W. H. Grainger, M.D., 408 Meridian street, E. B. (Tel. E. B. 212), Chapman Grammar and Primaries and Sacred Heart Parochial.
45. H. L. Plummer, M.D., 728 Saratoga street, E. B. (Tel. E. B. 334-2), Emerson Grammar and Primaries, Paul Jones Grammar and Star of the Sea Parochial.
46. O. H. Marion, M.D., 22 Harvard avenue, Allston (Tel. B. D. 172-2), Washington Allston Grammar, Harvard Primary, Everett Primary and Webster-avenue Primary.
47. H. S. Rowen, M.D., 30 Bennett street, B. D. (Tel. B. D. 73-2), William Wirt Warren Primary, Auburn Primary, Hobart-street Primary and Oak-square Primary and the St. Columbkille Parochial.
48. H. E. Marion, M.D., 5 Sparhawk street, B. D. (Tel. B. D. 45-2), Brighton High, Bennett Grammar, Winship Primary and Aberdeen Primary.

Dist.

49. W. F. Temple, M.D., 240 Huntington avenue, city (Tel. B. B. 622), Normal, Boys' Latin, English High, Girls' Latin, Girls' High and the Mechanic Arts High Schools.
50. W. P. Coues, M.D., 90 Charles street, city (Tel. Hay. 1535-2), Wells Grammar, Phillips Grammar and their Primaries.

REMOVAL OF BUILDINGS.

The removal of buildings and parts of buildings on account of evils in themselves or because they make other buildings unfit for habitation, and which cannot be remedied by repairs, has continued to receive an increasing amount of attention with gratifying results, not only from a sanitary point of view, but from the fact of a diminishing opposition. This work is invariably followed by increased sunlight and therefore a drier and cleaner air for the yards, kitchens, basements, halls, closets and stairways of the remaining buildings. There is an immediate and corresponding improvement of premises, cheerfulness of tenants and a gradual approval of landlords. The following is a list of the streets where this work has been done during the year, the number of buildings removed and the expense thereof:

| | |
|--------------------------------|--------------------|
| Albany street. | Middlesex street. |
| Ash street. | Oak street. |
| Billerica street. | Park street. |
| Cross street and Fulton court. | Parmenter street. |
| Harrison avenue. | Phipps street. |
| Harvard street. | Pleasant street. |
| Hudson street. | Salem street. |
| Hudson place. | Tileston street. |
| Hunneman street. | Tyler street. |
| Lawrence street. | Wall street. |
| Leverett street. | Washington street. |

Total expense, \$16,362.28.

Number of buildings removed, 169.

PAVING AND DRAINING ALLEYWAYS.

Acting under the provisions of chapter 119 of the Acts of 1894, the Board of Health has continued to select and require the paving and draining of such private alleyways as are found, on personal examination, to be usually muddy, filthy, offensive to sight and smell, and which can be put and kept in a sanitary condition only by suitable paving and surface

draining. Following is an account of the places and areas which have been thus dealt with during the past year, and which is done by and at the expense of the abutters:

Passageway from 218 Chambers street.

Passageway from 429 to 437 Columbus avenue.

Passageway from 69 Lowell street.

Passageway from 77 Lucas street.

Passageway from 31 Spring street.

Hickory avenue.

Lindall court.

Lucas street.

Oxford-place extension.

Oxford terrace and connecting alley from Huntington avenue.

Stanford place.

| | | | | |
|---|---|---|---|--------|
| Number of square yards of concrete laid | . | . | . | 12,450 |
| " " " brick laid | . | . | . | 1,000 |
| " " " stone laid | . | . | . | 6,060 |
| " " " granolithic laid | . | . | . | 5,000 |

NUISANCES ABATED.

The following table shows the number of nuisances abated by owners or occupants of premises, upon notice from the Board of Health:

| | January. | February. | March. | April. | May. | June. | July. | August. | September. | October. | November. | December. | Total. |
|---|----------|-----------|--------|--------|-------|-------|-------|---------|------------|----------|-----------|-----------|--------|
| House drains repaired, | 66 | 87 | 179 | 132 | 248 | 134 | 103 | 81 | 75 | 66 | 73 | 74 | 1,318 |
| Vaults cleaned..... | ..... | ..... | ..... | 10 | 7 | 3 | 12 | 7 | 4 | 2 | 6 | ..... | 51 |
| Traps supplied..... | 14 | 17 | 34 | 23 | 36 | 18 | 18 | 16 | 14 | 16 | 3 | 14 | 223 |
| Yards cleaned..... | 25 | 73 | 961 | 1,032 | 166 | 159 | 178 | 82 | 86 | 100 | 75 | 48 | 2,985 |
| Cellars cleaned..... | 54 | 74 | 257 | 195 | 171 | 126 | 113 | 85 | 88 | 64 | 59 | 49 | 1,335 |
| Cesspools cleaned..... | 1 | ..... | 10 | 25 | 27 | 23 | 21 | 11 | 14 | 18 | 5 | 17 | 172 |
| Water-closets cleaned and repaired..... | 109 | 140 | 300 | 231 | 344 | 143 | 72 | 78 | 78 | 50 | 60 | 111 | 1,716 |
| Number of places from which fowls were removed..... | 3 | 1 | 10 | 2 | 8 | 4 | 5 | 1 | 3 | 4 | 1 | 1 | 43 |
| Supply pipes repaired, | 20 | 28 | 61 | 22 | 36 | 20 | 21 | 7 | 8 | 11 | 11 | 25 | 270 |
| General cleaning and repairing..... | 27 | 53 | 88 | 80 | 96 | 70 | 34 | 22 | 27 | 25 | 20 | 37 | 579 |
| Dark rooms corrected, | 18 | 18 | 37 | 18 | 16 | 21 | 4 | 1 | 4 | 2 | 3 | 18 | 160 |
| Dark and unventilated water-closets remedied..... | 20 | 49 | 84 | 33 | 55 | 52 | 35 | 13 | 32 | 13 | 27 | 38 | 451 |
| Exposed manure removed..... | 4 | 3 | 3 | 14 | 2 | 5 | 4 | 3 | 2 | ..... | 1 | 1 | 42 |
| <i>Carried forward..</i> | 361 | 543 | 2,024 | 1,817 | 1,212 | 778 | 620 | 863 | 435 | 371 | 344 | 433 | 9,345 |

| | January. | February. | March. | April. | May. | June. | July. | August. | September. | October. | November. | December. | Total. |
|--|----------|-----------|--------|--------|-------|-------|-------|---------|------------|----------|-----------|-----------|--------|
| <i>Brought forward..</i> | 361 | 543 | 2,024 | 1,817 | 1,212 | 778 | 620 | 863 | 435 | 371 | 344 | 433 | 9,345 |
| Passageways cleaned. | 6 | 21 | 158 | 246 | 51 | 39 | 38 | 24 | 21 | 28 | 44 | 17 | 693 |
| Sheds cleaned..... | 3 | 6 | 17 | 18 | 23 | 27 | 68 | 9 | 11 | 8 | 3 | 7 | 205 |
| Tenements white-washed..... | 13 | 34 | 171 | 227 | 454 | 177 | 41 | 42 | 34 | 18 | 18 | 6 | 1,235 |
| Stables cleaned..... | 1 | 42 | 7 | 6 | 6 | 3 | 9 | .... | 3 | 2 | 3 | 3 | 85 |
| Sundry nuisances abated..... | 19 | 12 | 61 | 61 | 34 | 47 | 123 | 127 | 42 | 19 | 16 | 28 | 589 |
| Rain conductors repaired..... | 2 | 4 | 10 | 7 | 10 | 6 | 6 | 13 | 13 | 9 | 7 | 3 | 90 |
| Roofs repaired | 1 | 2 | 7 | 45 | 41 | 32 | 7 | .... | 5 | 2 | 6 | 3 | 151 |
| Receptacles provided for garbage..... | 29 | 7 | 212 | 209 | 18 | 29 | 222 | 201 | 203 | 119 | 63 | 28 | 1,340 |
| Places from which swine were removed, | 1 | .... | .... | .... | 2 | .... | .... | .... | 1 | 1 | 2 | .... | 7 |
| Stagnant water removed from vacant lots..... | .... | .... | 3 | 25 | 4 | 5 | 6 | 4 | 3 | 12 | .... | .... | 62 |
| Vacant lots cleaned.... | 1 | .... | 38 | 100 | 24 | 19 | 13 | 7 | 8 | .... | 13 | 5 | 228 |
| Houses cleared of dead rats..... | .... | 1 | 2 | .... | 1 | 1 | 1 | 1 | 1 | .... | .... | 1 | 9 |
| Overcrowded rooms relieved..... | 2 | 57 | 52 | 14 | 3 | 3 | 1 | 4 | 4 | .... | 2 | 3 | 145 |
| Gas-pipes repaired.... | 43 | 77 | 106 | 53 | 62 | 79 | 37 | 24 | 33 | 49 | 41 | 28 | 632 |
| Total..... | 481 | 807 | 2,868 | 2,823 | 1,950 | 1,245 | 1,192 | 863 | 817 | 638 | 562 | 565 | 14,816 |

EXAMINATION OF PLUMBERS.

During the past year weekly examinations have been held by the Board of Examiners of Plumbers, with the following result:

| | |
|--|-----|
| Number of applicants examined by the Board | 177 |
| Masters | 67 |
| Journeymen | 110 |
| Number of applicants certified for masters' licenses | 31 |
| Number refused | 36 |
| Number of applicants certified for journeymen's licenses | 49 |
| Number refused | 61 |

For many years the Board has had under consideration the question of adopting regulations for the handling and storing of manure that would do away with the old-fashioned manure pit, which is a serious objection to the stable itself, and, when emptied, is often a nuisance to the neighborhood. For a dozen years the Board has prohibited the use of manure

pits in newly erected stables, but on the 6th of December the following regulation was adopted to affect all stables in the city:

WHEREAS, In the opinion of the Board of Health the storing of manure of the excrement of domestic animals in said city is a nuisance, source of filth, and cause of sickness; it is therefore ordered:

First. — That no person having control of any stable in the City of Boston shall keep in, or permit to remain in said stable, or in or on any premises adjacent thereto, any manure or excrement of domestic animals, unless such manure or excrement is stored in tightly covered metallic cans or in carts constructed in a manner approved by the Board of Health.

Second. — All such manure or excrement which accumulates on any premises licensed by the Board of Health for use as a stable, shall be removed from said premises within forty-eight hours from the time said manure or excrement accumulates on said premises in tight, canvas covered vehicles, with the covering so secured to the sides and ends of the vehicles as to prevent the manure from being dropped or left in any street or way of the city in process of removal (and as much oftener as the Board of Health shall order in specific cases).

Third. — All receptacles used for storing such manure or excrement shall be kept clean to the satisfaction of the Board of Health.

Fourth. — No can or cart containing such manure or excrement shall be placed in or allowed to stand in any public way of the City of Boston.

Fifth. — No manure pit shall hereafter be maintained in the City of Boston.

APPOINTMENTS.

May 1, the Board organized by the choice of Samuel H. Durgin, M.D., as chairman, and Chas. E. Davis, Jr., as secretary.

October 14, Mr. Burt Ransom Rickards was appointed director of the bacteriological laboratory in place of Dr. H. B. Hill, who resigned to accept an appointment with the Board of Health of Minnesota.

October 14, Dr. Francis H. Slack was appointed assistant bacteriologist in place of Mr. Rickards, promoted.

November 3, Dr. J. B. Lyons was appointed on the corps of medical inspectors of schools in place of Dr. Williams, resigned.

Dr. James J. Scannell was appointed assistant bacteriologist in place of Dr. Slack, promoted.

SAMUEL H. DURGIN, M.D., *Chairman*,
THOMAS B. SHEA, M.D.,
DENNIS J. HERN.

FINANCIAL STATEMENT.

EXPENDED TO JANUARY 31, 1905.

| | | |
|---|----------|--------------|
| Board of Health | \$12,500 | 00 |
| Clerk-hire | 10,959 | 52 |
| Messenger service | 750 | 27 |
| Sanitary Inspectors | 34,239 | 71 |
| Inspector of Animals and Meats | 1,452 | 57 |
| Medical Officers | 5,200 | 02 |
| Disinfection | 21,501 | 08 |
| Smallpox Hospital | 4,937 | 39 |
| Contagious diseases other than small- pox | 30 | 40 |
| Medical inspection of schools | 10,000 | 00 |
| Vaccination | 84 | 90 |
| Laboratory | 8,739 | 99 |
| Nuisances | 1,153 | 93 |
| Morgue | 305 | 96 |
| Postage | 458 | 00 |
| Telephones | 1,450 | 56 |
| Traveling expenses — officers | 2,111 | 70 |
| Office expenses | 1,024 | 68 |
| Horse and vehicle — Board of Health and Medical Inspectors | 2,450 | 72 |
| Stationery | 895 | 26 |
| Printing | 5,773 | 97 |
| Advertising | 52 | 88 |
| Examination of plumbing and gasfitters, Inspection of milk and vinegar | 465 | 00 |
| Inspection of provisions | 11,459 | 32 |
| Inspection of provisions | 2,592 | 20 |
| Superintendent of Pedlers | 2,388 | 36 |
| Removal of buildings | 16,362 | 28 |
| Quarantine, sundries, and Port Phy- sician | 3,130 | 26 |
| Quarantine, Gallop's Island | 9,897 | 88 |
| “ steamer “ Vigilant ” | 16,538 | 57 |
| “ steamer “ Relief ” | 1,337 | 73 |
| Towns and cities on account of patients in City Hospital | 5,012 | 42 |
| | <hr/> | <hr/> |
| | | \$195,257 73 |

INCOME.

| | | |
|--|---------|-------|
| Quarantine | \$5,417 | 50 |
| Inspection of milk and vinegar | 981 | 50 |
| Smallpox | 1,028 | 94 |
| Leprosy | 816 | 00 |
| | <hr/> | <hr/> |
| Total | \$8,243 | 94 |

INVENTORY OF PROPERTY IN CHARGE OF THE BOARD OF HEALTH.

Office No. 11 Old Court House, office furniture and records.
Bacteriological Laboratory, 739 Boylston street, furniture
and scientific equipment.

Smallpox Hospital, Southampton street —

One building used as a hospital.

One building used as a disinfecting plant.

One building for quarantining suspected cases of rabies
in dogs.

Milk inspection, office and laboratory at 30 Huntington
avenue, with fittings and chemical apparatus for the
examination of milk and vinegar.

Morgue, North Grove street.

Disinfecting building in North Grove street, for the storage
of disinfectants — 12 horses, 5 wagons, 3 ambulances,
2 vans, 5 pungs, 1 undertaker's wagon, and 44 regen-
erators.

Quarantine steamer "Vigilant," with equipment.

Quarantine launch "Relief."

Gallop's Island, with the following buildings, etc.:

Rag-shed for the disinfection of rags.

4 polling-booths.

2 detention-houses.

1 bath-house.

Smallpox hospital.

Yellow fever hospital.

Overseer's house.

Barn.

Laboratory.

Carpenter shop.

Blacksmith shop.

2 wagons.

Ambulance.

Farming, carpenter and blacksmith tools.

2 horses.

3 cows.

REPORT OF DIRECTOR OF BACTERIOLOGICAL LABORATORY.

To the Board of Health :

GENTLEMEN, — We have the honor to submit the following report for the year ending January 31, 1906 :

TOTAL ROUTINE EXAMINATIONS.

The total number of routine bacteriological examinations made between February 1, 1905, and February 1, 1906, was 18,321. Of these, 12,762 were diagnosis and 5,559 were milk examinations.

REORGANIZATION.

During the year the technical staff of the laboratory was reorganized owing to the resignation of Dr. H. W. Hill as Director, the subsequent promotion of the first and second assistant bacteriologists and the appointment of a new second assistant. Dr. Hill resigned on September 1, after having served seven and one-half years as Director, in order to become Assistant Professor of Bacteriology in the University of Minnesota and Assistant Director of the State Laboratory of Minnesota. His connection with this laboratory thus dates back to its establishment in 1898, and on him fell the work of organization. The best wishes of his friends go with him in his new position.

NEW METHODS AND DEVICES.

A new method of estimating the number of bacteria in milk by direct microscopical examination has been devised by Dr. F. H. Slack, first assistant. An apparatus for shaking sputum specimens in order to break up coagulated masses and caseous particles was devised by the present Director. Both of these are described in detail later in the report.

A detailed account of the work performed during the year is given below in the following order :

1. Routine bacteriological diagnoses with tables.
2. Routine bacteriological milk examinations.
3. Special investigations.
4. Special information regarding the laboratory.

DIPHTHERIA.

Outfits. — The card contained in each outfit is now stamped in the upper left hand corner of the front side with the date on which the culture was issued from the laboratory. Physicians are urged to note the condition of the serum on obtaining a culture box from a culture station, and if the serum is dry or contaminated the box should be returned as "No Good" and a fresh outfit obtained. If the serum has curled away from the bottom of the tube or has become semi-transparent to a distance of more than one-half inch from the upper edge it should not be used.

Swab Examinations. — Physicians desiring swab examinations should instruct their messengers to request the same specifically of one of the attendants at the time the specimen is delivered at the laboratory. When requested, the laboratory is ready at all times during examination hours (ordinarily 9 A.M. to 5 P.M.; on Saturdays, 9 A.M. to 12 M.; on Sundays and holidays, 9 A.M. to 10 A.M.) to examine the swabs themselves from cases for diagnosis. It has been found that in about one-half of the cases finally proving positive after the ordinary incubation a positive diagnosis can be made from the swab without waiting for incubation, thus saving from fifteen to twenty-four hours.

Five o'clock Examinations. — All cultures for diagnosis reaching the laboratory before 12 M. will be incubated and examined at 5 P.M., except on Saturdays, Sundays and holidays.

Results on Swab and 5 o'clock Examinations. — Negative results are unreliable, and incubation is proceeded with. Positive results from swabs, five o'clock and over-night incubations are equally reliable, and such results are telephoned without delay to the physician.

Physicians desiring swab or five o'clock examinations must forward the culture to the laboratory at their own expense, as culture stations are forbidden to make trips before their regular hours.

Regular Incubation. — All cultures received up to 6 P.M. are placed in the incubator at 37° C., where they remain until taken out for examination the next morning.

All cultures taken too late to be forwarded by culture stations may be sent directly to the laboratory at the physician's expense at any time during the night, and there dropped through a chute directly into an incubator so that they become ready for examination the next morning. If it is impossible to send the culture in by special messenger it should be put in a cool place until ready to be forwarded.

As a general rule the results obtained by placing culture tubes near radiators or registers are not satisfactory, since the conditions are liable to be such as to cause diphtheria bacilli to be overgrown by other organisms.

Laboratory Reports on Culture Findings. — The report sent to the physician showing the result of the bacteriological examination for *B. diphtheriæ* may be one of four kinds — (1) Positive, (2) Negative, (3) Suspicious, (4) Unsatisfactory. If a smear shows organisms which resemble *B. diphtheriæ* to some degree, but which are not morphologically typical, a card is sent stating this fact and requesting a second specimen. In all cases for diagnosis where a negative result is obtained and where the physician states on the card that his clinical diagnosis is diphtheria, or where the pharynx and tonsils both show membrane, a second culture is requested. In all cases where physicians have made use of dry or contaminated tubes, or where organisms are present which liquify the serum, an "unsatisfactory" card is sent stating the condition of the culture and requesting another specimen.

Interpretation of Results. — A laboratory report of "negative," which at the same time would be contrary to the apparent facts of the case, may be returned (1st) in positive cases where the physician, in taking the culture, fails to touch the infected area (this may occur (*a*) in the case of very young children, from the difficulty of inserting the swab into the mouth or reaching the area desired; (*b*) in laryngeal cases, from difficulty in reaching the infected area; (*c*) in tonsillar infection, from the disappearance of the Klebs-Loeffler organisms from the surface of the tonsils and the difficulty of following them into the infected crypts); (2d) when the diphtheria bacilli are prevented from developing by the antagonism or rapid growth of some other organism; (3d) when the bacteriological diagnosis is positive, the patient being well or only slightly sick (the question of diphtheria bacilli in well persons, having been thoroughly covered in a report of a committee of the Massachusetts Association of Boards of Health,* will not be discussed here); (4th) when carelessness in taking the culture is permitted; (5th) in some cases where an antiseptic gargle or spray has been used shortly before the taking of the culture. The laboratory is of course not responsible for any of these apparent discrepancies.

Vincent's Angina. — It is sometimes possible in making swab examinations to discover the typical fusiform bacilli and spirilla associated with Vincent's angina. As these

* Journal of the Mass. Association of Boards of Health, Vol. XII p. 74.

organisms are anerobic they are of course not found in the incubated cultures.

Table No. 1. — Diphtheria.
SHOWING CULTURES CLASSIFIED.

| | Positive. | Negative. | No Growth. | Total. |
|-----------------|-----------|-----------|------------|--------|
| Primary | 694 | 4,061 | 110 | 4,865 |
| Secondary | 663 | 1,751 | 52 | 2,466 |
| Total | 1,357 | 5,812 | 162 | 7,331 |
| | 19% | 79% | 2% | |

Table No. II. — Diphtheria.
SHOWING CASES CLASSIFIED.

| | POSITIVE. | | NEGATIVE. | | NO GROWTH. | TOTAL. | | TOTAL. | | | Grand Total. |
|---------------|----------------|-------------------|----------------|--------------|---------------------|----------------|-------------------|-----------|-----------|------------|--------------|
| | For Diagnosis. | For release only. | For Diagnosis. | For release. | For Diagnosis only. | For Diagnosis. | For release only. | Positive. | Negative. | No Growth. | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
| 1905. | | | | | | | | | | | |
| February ... | 42 | 6 | 329 | 23 | 5 | 376 | 29 | 48 | 352 | 5 | 405 |
| March | 45 | 5 | 406 | 13 | 7 | 453 | 18 | 50 | 419 | 7 | 476 |
| April | 37 | 3 | 353 | 15 | 6 | 396 | 18 | 40 | 368 | 6 | 414 |
| May | 29 | 1 | 343 | 24 | 14 | 386 | 25 | 30 | 367 | 14 | 411 |
| June | 28 | 5 | 145 | 20 | 11 | 184 | 25 | 33 | 165 | 11 | 209 |
| July | 40 | 7 | 190 | 20 | 2 | 232 | 27 | 47 | 210 | 2 | 259 |
| August | 39 | 8 | 157 | 16 | 7 | 203 | 24 | 47 | 173 | 7 | 227 |
| September... | 39 | 8 | 194 | 10 | 3 | 236 | 18 | 47 | 204 | 3 | 254 |
| October | 88 | 10 | 224 | 15 | 5 | 317 | 25 | 98 | 239 | 5 | 342 |
| November ... | 100 | 14 | 409 | 22 | 4 | 513 | 36 | 114 | 431 | 4 | 549 |
| December ... | 98 | 15 | 469 | 34 | 8 | 575 | 49 | 113 | 503 | 8 | 624 |
| 1906. | | | | | | | | | | | |
| January | 103 | 7 | 562 | 17 | 11 | 676 | 24 | 110 | 579 | 11 | 700 |
| | 688 | 89 | 3,781 | 229 | 83 | 4,552 | 318 | 777 | 4,010 | 83 | 4,870 |

Column 1 shows the whole number of persons proving positive for diagnosis. In some of these cases the first culture was negative, but subsequent cultures for diagnosis were positive. Column 2 shows the total persons positive for release only, no culture (or in a very few cases a negative culture) being taken for diagnosis. Column 3 shows cases negative throughout for diagnosis. A few of these were reported as diphtheria in spite of the negative cultures, but these proved negative for release also. Column 5 shows cases on which none but no growth cultures were received.

Table No. III. — Diphtheria.

SHOWING COMPARISON OF WORK DONE IN DIFFERENT YEARS.

Actual Number of Cultures and Persons Examined.

| Feb. 1 to Feb 1. | CULTURES. | | | | PERSONS. | | | | Cases Reported. |
|-------------------------|------------|----------------|--------------|--------|------------|---------------------|---------------------|----------------|-----------------|
| | Per Month. | For Diagnosis. | For Release. | Total. | Per Month. | Positive Diagnosis. | Negative Diagnosis. | Total Release. | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 1898 (estimated)..... | 440 | 2,059 | 3,205 | 5,264 | 190 | 400 | 1,500 | 550 | 1,661 |
| 1899..... | 660 | 4,406 | 3,522 | 7,930 | 380 | 1,019 | 2,920 | 1,002 | 2,836 |
| 1900 (approximate)..... | 1,560 | 8,000 | 10,889 | 18,889 | 700 | 2,100 | 5,600 | 2,000 | 5,020 |
| 1901..... | 944 | 6,689 | 4,615 | 11,304 | 544 | 1,176 | 4,679 | 1,249 | 2,906 |
| 1902..... | 660 | 5,506 | 2,223 | 7,729 | 438 | 726 | 4,140 | 781 | 1,881 |
| 1903..... | 732 | 5,659 | 3,122 | 8,780 | 464 | 922 | 4,149 | 892 | 2,166 |
| 1904..... | 770 | 5,966 | 3,251 | 9,237 | 479 | 1,047 | 4,219 | 965 | 2,440 |
| 1905..... | 631 | 5,167 | 2,164 | 7,331 | 405 | 688 | 3,781 | 579 | 1,554 |

Relative Number of Cultures and Persons Examined (Calculated per 100 Cases Reported).

| | | | | | | | | | |
|-----------|-----|-----|-----|-----|-----|----|-----|----|-------|
| 1898..... | 320 | 120 | 192 | 320 | 137 | 24 | 90 | 33 | 1,661 |
| 1899..... | 280 | 155 | 124 | 280 | 160 | 36 | 103 | 35 | 2,836 |
| 1900..... | 370 | 169 | 216 | 370 | 167 | 42 | 111 | 39 | 5,020 |
| 1901..... | 380 | 230 | 158 | 380 | 224 | 40 | 161 | 42 | 2,906 |
| 1902..... | 411 | 292 | 112 | 411 | 279 | 38 | 220 | 41 | 1,881 |
| 1903..... | 405 | 261 | 144 | 405 | 257 | 42 | 191 | 41 | 2,166 |
| 1904..... | 378 | 245 | 133 | 378 | 236 | 43 | 173 | 40 | 2,440 |
| 1905..... | 471 | 332 | 139 | 471 | 313 | 44 | 243 | 37 | 1,554 |

It will be seen from this table that the total number of cases of diphtheria reported to the Board dropped about one-third, and that as might have been expected the total number of cultures also dropped somewhat. It is, however, interesting to note that the relative number of cultures submitted for diagnosis, calculated on a basis of work done per 100 cases of diphtheria reported to the department, shows with two exceptions a steady increase (column 2), and that the figure for 1905 is far in advance of any previously obtained. Likewise, as might be expected, the proportion of negative persons for diagnosis per 100 cases reported (column 7) shows a very considerable increase. The proportion of the

number of persons reported positive for diagnosis at the laboratory to the total number of persons reported (column 6) is also higher for 1905 than ever before. These figures would appear to indicate an increasing desire on the part of the physician to have bacteriological diagnoses made in cases only slightly suspicious.

The total number of cultures for release and of persons released by the laboratory has remained fairly constant.

Table No. IV. — Diphtheria.

SHOWING AVERAGE LENGTH IN DAYS AND WEEKS FROM DATE OF FIRST POSITIVE TO SECOND NEGATIVE.

| MONTH. | Number of Cases. | Average in Days. | Number Cases running less than 1 Week. | Number Cases running between 1 and 2 Weeks. | Number Cases running between 2 and 3 Weeks. | Number Cases running more than 3 Weeks. |
|---------------------|------------------|------------------|--|---|---|---|
| February, 1905..... | 20 | 13.4 | 0 | 18 | 4 | 3 |
| March..... | 21 | 11.6 | 1 | 15 | 3 | 2 |
| April..... | 18 | 12.9 | 3 | 9 | 3 | 3 |
| May..... | 19 | 11.4 | 3 | 12 | 4 | 0 |
| June..... | 7 | 14.5 | 1 | 2 | 4 | 0 |
| July..... | 15 | 11.4 | 3 | 8 | 3 | 1 |
| August..... | 15 | 15.0 | 0 | 8 | 6 | 1 |
| September..... | 20 | 15.5 | 3 | 9 | 3 | 5 |
| October..... | 48 | 16.7 | 3 | 20 | 9 | 16 |
| November..... | 42 | 16.6 | 1 | 18 | 14 | 9 |
| December..... | 47 | 17.6 | 4 | 18 | 16 | 14 |
| January, 1906..... | 60 | 13.6 | 6 | 32 | 14 | 8 |
| | 332 | 14.2 | 28 8% | 159 48% | 83 25% | 62 19% |

This table is necessarily based on those cases where cultures were submitted to the laboratory for diagnosis, the patient being also released later on by the laboratory. A large number of positive cases are removed to the City Hospital, and, being finally released from there, cannot be brought into this account.

Referring to the above table, it is of interest to note that the average number of days from the date of the first positive culture to the date of release is but a fraction over two

weeks, that over half the cases have been released in less than two weeks, while over three-quarters of the cases are released in three weeks or less. In the year 1900 the average number of days from the earliest symptoms to the first positive * was found to be 2.4 days, and the number of days from the date of earliest symptoms to the second negative was found to be between three and four weeks. Thus it would appear that the length of the quarantine period is lessening.

It is perhaps fair to assume from the above table that those cities and towns which release a diphtheria patient from quarantine ten days after the disappearance of the membrane are in a large number of cases holding the patient an unnecessary length of time, while on the other hand, such a time limit releases a certain (smaller) percentage while the throats still contain virulent diphtheria bacilli.

TUBERCULOSIS.

Outfits. — For suspected tubercular sputum, square, wide-mouth bottles of about an ounce capacity are supplied, contained in a pasteboard box and accompanied by a paper form with directions on one side, and on the other side blank spaces to be filled out by the physician with particulars of the case.

Examination. — Briefly, the examination consists in smearing the sputum upon a glass slide, drying, staining with hot carbol fuchsin, washing in water, decolorizing in a solution consisting of 3 per cent. of hydrochloric acid in 95 per cent. alcohol, washing again and counterstaining with Loeffler's methylene blue.

As each year has seen a decided increase in the number of sputum specimens to be examined, methods have been devised which have either materially shortened the time consumed in preparing the specimens or have increased the efficiency of the examination. In 1900 an apparatus was designed † by which specimens to the number of thirty-six may be stained or decolorized or washed in a single operation. Later a water bath was added on which the long slides may be laid while the smears are being made, the bath being kept at boiling temperature. The heat thus obtained causes the sputum to smear much more easily and smoothly than would be otherwise the case. More recently (December, 1905) a shaking machine has been devised by the present director of the laboratory in which sixteen sputum bottles can be placed

* Annual Report of the Board of Health, 1900, p. 100, table 10.

† Rickards. Journal Soc. Med. Sciences, Vol. 5, p. 391.

at one time and shaken until all caseous particles and coagulated lumps are broken up and the contents of the bottle rendered homogeneous throughout. The chances of finding the bacilli of tuberculosis when these are very few in number are undoubtedly increased by this method, while the greater ease of smearing and the prevention of "scaling" from the slide are particularly noticeable.

Examination of Urines for B. Tuberculosis.—If the examination of urine for *B. tuberculosis* is desired, it is best to send to the laboratory the whole amount passed in twenty-four hours. Special precautions should be taken to prevent contamination with smegma or other foreign matter.

Usually such cases require the injection of guinea pigs to establish the diagnosis, and the results are then available only after six weeks have elapsed.

The Interpretation of Bacteriological Findings in the Diagnosis of Tuberculosis.

Positive Results.—It is probable that very occasionally a few tubercle bacilli may be found in the mouths of healthy persons, but persons suffering from any affection of the lungs, larynx, etc., and presenting also the tubercle bacillus in their expectoration may safely be considered as suffering from the disease. It is not unlikely that very occasionally non-virulent bacilli, resembling tubercle bacilli in appearance, staining, reactions, etc., may be present in sputum; in such cases a guinea pig test is necessary for differentiation. In smegma such an organism is not rare, and this should be taken into account when collecting or examining material likely to be contaminated with smegma.

Negative Results.—A single negative result does not demonstrate the absence of the bacilli from the particular specimen of sputum examined, nor, if that absence be confirmed by subsequent examinations of successive specimens, is the absence of the disease necessarily established. A negative result from a patient suffering from consumption may depend on (a) improper collection of specimen, saliva being taken instead of true pulmonary expectoration (ordinarily the saliva of a patient whose sputum contains the bacilli will be infected, but the numbers will usually be relatively small); (b) the presence of but few bacilli in the sputum—the microscopic examination being unreliable for the detection of very small numbers; (c) the absence of the bacilli from the sputum notwithstanding the presence of the disease. This latter is to be expected when there is little or

no breaking down of the lung tissue, as in early stages of chronic consumption, and sometimes throughout the course of acute miliary tuberculosis.

A clinical diagnosis of tuberculosis, pulmonary or genito-urinary, should not be reversed upon a single negative result. The errors described under *a* and *b* may be eliminated by repeated examination, but it is a question whether even a dozen negative sputum examinations should be allowed to offset well-marked clinical indications in such cases as are given under *c*.

Rules Governing the Submission of Sputum Samples. — Since the examination of tubercular sputum entails some danger to the examiner if indiscriminate outfits are used, and since the use of a single style of bottle expedites the work, the following rules have been adopted :

1. Specimens will not be examined unless submitted in bottles provided by the laboratory.
2. Specimens will not be examined if leaking from the bottle has occurred.
3. Reports will not be forwarded unless the particulars of the case are sent with the specimen.

Table No. 1. — Tuberculosis.

MONTHLY TOTALS OF EXAMINATIONS.

| MONTH. | Positive. | Negative. | Total. |
|---------------------|-------------------|---------------------|--------------|
| February, 1905..... | 79 | 207 | 286 |
| March..... | 89 | 304 | 393 |
| April..... | 67 | 285 | 352 |
| May..... | 70 | 330 | 400 |
| June..... | 72 | 232 | 304 |
| July..... | 64 | 203 | 267 |
| August..... | 54 | 153 | 207 |
| September..... | 69 | 196 | 265 |
| October..... | 78 | 209 | 287 |
| November..... | 70 | 219 | 289 |
| December..... | 53 | 229 | 282 |
| January, 1906..... | 86 | 232 | 318 |
| Totals..... | 851 23% | 2,799 77% | 3,650 |

Table No. II. — Tuberculosis.

SHOWING CASES CLASSIFIED.

| Positive. | Negative. | Total. |
|-----------|-----------|--------|
| 782 | 2,404 | 3,186 |
| 25% | 75% | |

Of the 782 positive cases, 96 per cent. (753) were found to be positive on the first examination, and 4 per cent. (29) on subsequent examinations.

TYPHOID.

The dried blood method for the serum reaction is used.

Outfit. — This consists of aluminum foil, on which the blood is to be dried, and a small copper wire loop for transferring the blood to the foil. With this foil is a card, to be filled out by the physician, and a circular of directions. All three fit into a manila envelope for safe keeping. After the physician has taken the blood preparation it is returned to the laboratory by mail, postage two cents.

Examination. — The dried blood is mixed on the foil with sterile water; a drop of this is mixed on a coverslip with a drop of broth containing the bacilli, a total dilution of one in fifty being used. This preparation, mounted as a "hanging drop," is observed at intervals under the microscope for one hour. If loss of motility only, or clumping only, occurs, the preparation is called atypical, and another specimen requested. If both occur, a positive, and if neither, a negative report is sent.

Interpretation of Results of Serum Tests in Typhoid Fever. — The reactions occur in the blood as one of the results of the reaction of the body forces to the action of the bacilli. They may be obtained from rabbit's blood within three or four days after injecting the rabbit with living or dead bacilli. In such rabbits the reaction is not necessarily or usually associated with the lesions, intestinal or otherwise, characteristic of typhoid fever in the human patient. Nor is it essential that the human patient should have the ordinary symptoms, or lesions, of intestinal typhoid fever in order to develop a reaction. It is sufficient that the human patient should suffer from the effects of the bacilli, whatever clinical or anatomical conditions may accompany them. Moreover, once developed, the reaction may last for years after recovery, although usually it disappears within a few months. The

presence of the reaction in the human patient means, then, the existence at some time past or present of an infection with the typhoid bacilli (Cabot), usually, but not necessarily, an infection taking the ordinary form of clinical typhoid fever.

An atypical result means little. Subsequent results may be either positive or negative. A single negative is not conclusive. The reaction does not usually develop until after the fifth day of the disease and may be delayed considerably longer. Moreover, once it appears it may not be constantly present thereafter.

Paratyphoid Fever. — The laboratory stands ready to make the serum test for paratyphoid fever if twenty-four hours' notice is given that such a diagnosis is desired. A broth culture is then inoculated and the test made at the same time as the reaction for typhoid fever.

Table No. 1. — Typhoid.

MONTHLY TOTALS OF WIDAL REACTIONS.

| MONTH. | Positive. | Negative. | Atypical. | Totals. |
|---------------------|-----------|-----------|-----------|---------|
| February, 1905..... | 8 | 58 | 1 | 67 |
| March..... | 4 | 59 | 1 | 64 |
| April..... | 2 | 71 | 0 | 73 |
| May..... | 7 | 71 | 10 | 88 |
| June..... | 5 | 57 | 10 | 72 |
| July..... | 2 | 86 | 1 | 89 |
| August..... | 18 | 155 | 7 | 180 |
| September..... | 22 | 130 | 41 | 193 |
| October..... | 20 | 117 | 13 | 150 |
| November..... | 13 | 88 | 8 | 109 |
| December..... | 11 | 75 | 25 | 111 |
| January, 1906..... | 14 | 68 | 3 | 85 |
| Totals..... | 126 | 1,085 | 120 | 1,331 |
| | 10% | 81% | 9% | |

Nearly half of the total number of blood specimens were received during August, September and October, and one-half of the total positives were obtained during those months. The number of specimens received during August was more than double the number received in July. It is probably true that a large percentage of the typhoid in Boston is either

contracted at summer resorts and brought back to Boston by returning vacationists or is contracted by direct contact with persons so infected.

Table No. II. — Typhoid.
SHOWING CASES CLASSIFIED.

| Positive. | Negative. | Unsatisfactory. | Total. |
|-----------|-----------|-----------------|--------|
| 117 | 896 | 50 | 1,063 |
| 11% | 84% | 5% | |

MALARIA.

Outfit. — This consists of a small, flat tin box, which contains two glass slides. On application to the laboratory one such box, accompanied by a circular of directions and a card to be filled out with the particulars of the case by the physician, is mailed to the address given. The outfit should be returned to the laboratory by mail; postage four cents.

Examination. — Wright's method of staining is used. The greatest care should be exercised to obtain a *thin, even smear of blood upon the slide*, and the directions accompanying each outfit should be very carefully followed for this reason. Better and more satisfactory results can be obtained by the examination of *fresh, undried blood*. The physician places a *small* drop of blood on a slide, quickly drops a coverslip upon it, and at once seals the coverslip to the slide with a little vaseline, carefully applied to the whole circumference of the coverslip. This preparation must be taken to the laboratory at once by a careful person, who is directed not to disturb it in any way.

Malaria.

| Positive. | Negative. | Unsatisfactory. | Total. |
|-----------|------------|-----------------|--------|
| 17 9% | 156 86% | 9 5% | 182 |

GLANDERS.

Outfit. — An outfit consisting of two sterile cotton swabs similar to those used in the diphtheria outfit, a circular giving directions for taking the specimen, and a card for particulars of the case will be sent to any veterinarian on request. The object to be sought by the veterinarian is the accumulation

on the cotton of as much as possible of the suspected material from the nasal discharge or ulcers of the suspected animal.

Examination.—On receipt of an outfit at the laboratory the swab is transferred into five c.c. of sterilized water and shaken thoroughly in it. The resulting suspension is inoculated intra-abdominally into full-grown male guinea pigs, and a positive or negative diagnosis is usually based upon the development or non-development of testicular lesions within seven days, after further examination of the testes, when enlarged, for the isolation of the organism.

Interpretation of Results.—A single negative or unsatisfactory result should not be taken as conclusive. An unsatisfactory report is sent in those cases where the experimental animal dies within a short time after inoculation, without development of typical lesions or lesions from which the glanders organism can be isolated. It is evident in such cases that the glanders organism may be present, but that other virulent organisms are also present in the injected material and have caused death before the glanders organism has had time to develop.

Mallein.—This diagnostic agent is made in the laboratory for the use of the Board of Health in testing horses for glanders. It is also supplied free to veterinarians. The methods of preparation and use and the interpretation of the results are given in the annual report for 1900.

Table No. 1. — Glanders.

MONTHLY TOTAL OF GUINEA PIG TESTS.

| MONTH. | Positive. | Negative. | Unsatisfactory. | Total. |
|---------------------|-----------|-----------|-----------------|--------|
| February, 1905..... | 6 | 4 | 8 | 18 |
| March..... | 4 | 7 | 4 | 15 |
| April..... | 2 | 11 | 9 | 22 |
| May..... | 3 | 5 | 4 | 12 |
| June..... | 2 | 5 | 6 | 13 |
| July..... | 0 | 6 | 3 | 9 |
| August..... | 1 | 3 | 6 | 10 |
| September..... | 6 | 4 | 12 | 22 |
| October..... | 4 | 6 | 6 | 16 |
| November..... | 2 | 7 | 1 | 10 |
| December..... | 5 | 12 | 0 | 17 |
| January, 1906..... | 6 | 18 | 6 | 30 |
| Totals..... | 41 | 88 | 65 | 194 |

Table No. II. — Glanders.
SHOWING CASES CLASSIFIED ON GUINEA PIG TESTS.

| MONTH. | Positive. | Negative. | Unsatisfactory. | Total. |
|--|-------------|-------------|-----------------|------------|
| February 1, 1905, to February 1, 1906. | 30 82.6% | 44 47.8% | 18 19.6% | 92 100% |

Secondary Tests. — Two cases positive on the first test were also positive on the second. Of fifteen negative on the first test, four came positive on the second and one on the fourth test, six remained negative, and on four the succeeding tests were unsatisfactory. Of eight unsatisfactory on the first test, two were positive and two negative on the second, while four remained unsatisfactory.

Average time from inoculations to symptoms, 40 cases, 5 days.

Average time, leaving out delayed cases, 32 cases, 2 days.

Eight delayed cases, 38, 30, 13, 8, 7, 6, 5 and 5 days respectively.

Four guinea pigs showed special lesions.

No. 1, 38-day case, abscess on leg; testicles adherent in abdomen.

No. 2, 30-day case, large abscess on mesentery; testicles typical.

No. 3, 3-day case, general infection, typical cultures from heart and liver; no testicular lesions.

No. 4, 2-day case, abscess of omentum; mixed infection of *B. mallei* and cocci; testicles typical.

RABIES.

One case was submitted to the laboratory during the early spring. Negri bodies were found and a positive report rendered.

Collection of Specimen. — Dogs or other animals having symptoms of rabies should not be killed, but should be confined securely and notification sent to the veterinarian of the Board of Health. If the suspected animal dies his whole carcass should be preserved and notification sent as above. Failing this the head at least should be preserved for examination.

Examination. — Through the work of Negri, an Italian scientist, who in 1904 discovered the probable cause of rabies,

and more recently by the investigations of Frothingham* and others, the laboratory is now able to report results of examinations for rabies in positive cases within a few hours after the receipt of the brain. The importance of such an early diagnosis on positive cases is obvious. It is now generally accepted that the presence of the Negri bodies is diagnostic of rabies.

Frothingham's method of staining and technique have proved very satisfactory.

Impression smears are first made from portions of the Ammon's horn. If these prove positive further tests are unnecessary and a report can be forwarded at once. If the impression smears show no Negri bodies, portions of the Ammon's horn and cerebellum are hardened, imbedded in paraffin and sectioned. An examination of sections from the Gasserian ganglia for pathological changes is of value, but not absolutely diagnostic of rabies. If these sections prove negative guinea pigs are inoculated under the dura with an emulsion of portions of the brain and cord.

In the latter case, if positive, it is usually from ten days to two weeks before symptoms are noted, and they may be delayed for a much longer period of time.

GONORRHOEAL OPHTHALMIA.

The Legislature of 1905 made it obligatory on the part of the attending physician or nurse to report to the Board of Health any case of eye inflammation occurring within two weeks after birth. In order to meet the situation the laboratory has prepared an outfit to be used in cases of this kind. The outfit, which was devised by Dr. H. W. Hill, consists of two sterilized wire loops in separate small envelopes, two labelled glass slides, a card to be filled out by the physician and a sheet of directions for taking the smears. The slides are surrounded by a strong rubber band, then enclosed in a tin box, and the box also surrounded by a rubber band to prevent breakage. The assembled parts of the outfit are received in a strong manila envelope which can be mailed directly to the laboratory, postage four cents. Two loops are included in each outfit — one for each eye, in order to avoid the chance of carrying infection from one eye to the other. Two separate smears on each slide should be made if possible in order that a Grams stain may be made to confirm the diagnosis if intracellular diplococci are present.

* Journal Medical Research, 1906, Vol. xlv., p. 471

Ophthalmia.*

| Positive. | Negative. | Unsatisfactory. | Total. |
|-----------|-----------|-----------------|--------|
| 13 | 23 | 4 | 40 |
| 33.5% | 57.5% | 10% | |

* Work began in September. Table shows results obtained between September 1, 1906, and February 1, 1906.

OTHER EXAMINATIONS.

Any disease of a bacteriological nature will be examined for free of charge. Before collecting specimens from diseases other than those already enumerated communication should be had with the laboratory.

Special examinations during the past year have included examinations for the organisms causing anthrax, leprosy, rabies, cerebro-spinal meningitis, septic wounds, etc., and for diphtheria and streptococcus virulence.

Miscellaneous Examinations.

| Positive. | Negative. | Unsatisfactory. | Total. |
|-----------|-----------|-----------------|--------|
| 28 | 80 | 6 | 114 |

The above table includes one or more examinations of the following: Gonorrhœa, pneumonia, influenza, leprosy, genito-urinary tuberculosis, rabies, cerebro-spinal meningitis, septic wounds, empyema, diphtheria, staphylococcus and streptococcus virulence, necrosis, abscess, hydrocele, anthrax, paratyphoid, etc.

**Table Summarizing Routine Examinations for Year Ending
January 31, 1906.**

| | Diphtheria. | Tuberculosis. | Typhoid. | Glanders. | Malaria. ¹ | Ophthalmia. ² | Other Diseases. ³ | Total. | Milk Exam- inations. | Grand Total. |
|---------------------|--------------|---------------|--------------|------------|-----------------------|--------------------------|------------------------------|---------------|-------------------------|---------------|
| February, 1905..... | 579 | 286 | 67 | 20 | 0 | .... | 12 | 984 | 556 | 1,520 |
| March..... | 649 | 393 | 64 | 11 | 0 | .... | 4 | 1,121 | 624 | 1,745 |
| April..... | 545 | 352 | 73 | 23 | 11 | .... | 3 | 1,006 | 503 | 1,509 |
| May..... | 523 | 400 | 18 | 12 | 17 | .... | 8 | 1,048 | 566 | 1,614 |
| June..... | 361 | 304 | 72 | 10 | 18 | .... | 8 | 773 | 642 | 1,415 |
| July..... | 401 | 267 | 89 | 11 | 27 | .... | 1 | 796 | 434 | 1,230 |
| August..... | 336 | 207 | 180 | 6 | 28 | .... | 9 | 766 | 261 | 1,027 |
| September..... | 315 | 265 | 193 | 18 | 31 | 8 | 3 | 833 | 216 | 1,049 |
| October..... | 570 | 287 | 150 | 13 | 12 | 6 | 12 | 1,060 | 411 | 1,461 |
| November..... | 950 | 289 | 109 | 11 | 20 | 15 | 13 | 1,407 | 316 | 1,723 |
| December..... | 1,024 | 282 | 111 | 23 | 12 | 6 | 20 | 1,478 | 428 | 1,906 |
| January, 1906..... | 1,078 | 318 | 85 | 17 | 6 | 5 | 11 | 1,520 | 602 | 2,122 |
| Totals..... | 7,331 | 3,650 | 1,281 | 174 | 182 | 40 | 104 | 12,762 | 5,559 | 18,321 |

¹ Seventeen positives.² Thirteen positives.³ Including gonorrhœa, pneumonia, influenza, etc.

**Table Summarizing Routine Examinations for Eight Years,
Ending January 31, 1906.**

| | Diphtheria. | Tuberculosis. | Typhoid. | Glanders. | Malaria. | Ophthalmia. | Other Examinations. | Milk Examinations. | Total. | Average Per Day. |
|------------------------|-------------|---------------|----------|-----------|----------|-------------|---------------------|--------------------|---------|------------------|
| 1898-1899 (9 mos.).... | 3,948 | ..... | 122 | ..... | ..... | ..... | ..... | ..... | 4,070 | 15 |
| 1899-1900..... | 7,930 | ..... | 483 | 65 | 19 | ..... | 29 | ..... | 8,526 | 24 |
| 1900-1901..... | 18,889 | 1,021 | 1,014 | 119 | 38 | ..... | 44 | ..... | 21,125 | 57 |
| 1901-1902..... | 11,304 | 1,957 | 1,049 | 158 | 85 | ..... | 52 | ..... | 14,605 | 40 |
| 1902-1903..... | 7,729 | 2,322 | 984 | 140 | 98 | ..... | 32 | ..... | 11,305 | 31 |
| 1903-1904..... | 8,780 | 2,914 | 1,088 | 175 | 98 | ..... | 46 | ..... | 13,101 | 36 |
| 1904-1905..... | 9,237 | 3,115 | 1,164 | 147 | 134 | ..... | 91 | 3,468 | 17,356 | 47 |
| 1905-1906..... | 7,331 | 3,650 | 1,261 | 174 | 182 | 40 | 104 | 5,559 | 18,274 | 50 |
| | 75,148 | 14,979 | 7,185 | 978 | 654 | 40 | 398 | 9,027 | 108,362 | 37 |

The total number of diphtheria examinations made during the past fiscal year was less than any other year except during 1898, when the laboratory was first started. The total number of cases of diphtheria reported to the department also dropped lower than any other year since 1898.

The number of examinations for suspected tubercular sputum has shown a steady increase year by year since this work was begun in 1900. It is evident that many physicians are awakening to the value of making an early diagnosis and are submitting specimens wherever the slightest suspicion exists.

The average number of specimens examined per day during 1905 was higher than for any year since the diphtheria epidemic of 1900.

THE BACTERIOLOGICAL EXAMINATION OF MILK.

Historical Sketch. — In April, 1904, the Board of Health passed a regulation forbidding the sale of milk containing over 500,000 bacteria per cubic centimeter or having a temperature over 50° F.

The bacteriological examination of milk was first begun in May, 1904, when Dr. F. H. Slack was appointed as milk bacteriologist. The work was under the immediate supervision of Dr. H. W. Hill, then director of the laboratory, and all results obtained were passed into the hands of Dr. Charles Harrington, then Inspector of Milk. The first month was spent in assembling the necessary apparatus and laying out the work.

As Boston was one of the pioneers in the municipal control of milk from a bacteriological standpoint, and as the conditions here were somewhat different from those found in other cities, much of the apparatus and most of the technique used is original with the first two men above mentioned. Following is a short list of apparatus so designed which has since been copied by many of the cities that have recently taken up this work:

1. Collecting case with sterile test tubes in racks, ice compartments, and pipette box with sterile pipettes.
2. Counting apparatus.
3. Centrifugal disc and tubes for obtaining sediment from milk (modified form of Stewart's apparatus).
4. Porous tops for Petri dishes, preventing "spreaders."
5. Special dilution bottles.

A description of the technique used may be found in the *Journal of Public Hygiene*, Vol. XIV., page 236.

During the past year a method for the direct microscopical examination of milk quantitatively was devised by Dr. F. H. Slack, by which considerable time and labor is saved.

In carrying out routine examinations of milk sediments for pus and streptococci he noticed that the number of bacteria found in the microscopic field apparently bore a definite relation to the number of colonies developing in the plate from the same sample. It was thought that this might be of practical value if, after prolonged comparison, it turned out to be constantly true, since there would then be no necessity to plate, incubate and count samples which the microscope alone indicated were better than the legal requirements. Winslow,¹ using $\frac{1}{2}$ cubic centimeters of unsedimented material, had previously applied the direct microscopic enumeration of bacteria to water and sewage. It was decided to test the method thoroughly, comparing the microscopic estimate with the actual count obtained from the plate. This comparison was carried out very carefully with over 2,200 samples, each sample being subjected to the double test, *i.e.*, centrifugalizing and plating, the microscopic estimate being made before the plate was counted, usually within a few hours after the samples were received. The error in passing, as "below 500,000 bacteria to the cubic centimeter," milks which in the plates showed above this limit was less than 1 per cent. of the total samples examined. Over a third of the total error occurred in the first 420 samples before the method was fully developed.

The apparatus and the method for making the microscopic estimate are as follows: ²The special apparatus for centrifugalizing the milk, modified from one used by Stewart of Philadelphia, consists of an aluminum disk and cover, 10 inches in diameter and $\frac{3}{8}$ inch in depth, fitted to hold twenty small glass tubes arranged radially. These tubes hold about 2 cubic centimeters each, and are closed at both ends with rubber stoppers.

The milk sample is thoroughly shaken, the tubes filled, stoppered, inserted into their proper numbered receptacles in the disk, and centrifugalized for ten minutes at a speed of from two to three thousand revolutions a minute. Thus in each tube the whole sediment from a known quantity of milk is obtained, and may be spread over a given area. A space of about 4 square cm. is most convenient, being the right size to allow thorough emulsion of the sediment with a drop or two of sterile water, and to permit drying into a thin, even smear. It is convenient to smear a number of samples con-

¹ Jour. Inf. Diseases, May, 1905, Sup. No. 1.

²Technology Quarterly, XIX., p 37.

secutively on a long glass slide which has previously been correctly spaced with a blue pencil.

To obtain the sediment with the least disturbance, the stopper is first removed from the inner, or cream, end; then the tube is held with the cream end downwards, the cream removed with a platinum loop, and the milk poured out; lastly, still holding the cream end down, the other stopper is carefully removed with the adhering sediment and the sediment smeared evenly with a drop of sterile water over the measured space on the glass slide, the stopper being rubbed directly on the glass until the sediment has been transferred. When this is properly done the amount of diluted sediment remaining on the stopper is practically negligible. The smear is then dried with gentle heat and stained with methylene blue.

The microscopical examination of a milk sediment thus easily prepared reveals more than any other single test. It shows the character of the milk, the approximate number and the morphology of the bacteria, and the presence of pus or streptococci.

It is not claimed that all the bacteria in the milk subjected to centrifugalization are precipitated into the sediment; but it is claimed that in 99 per cent. of the samples a representative number is so precipitated, and that this number bears a fairly constant relation to the $\frac{1}{10000}$ dilution plate culture when grown in a saturated atmosphere at 37° C. for twenty-four hours, 1 per cent. agar being used with a reaction of + 1.5.

We may say, as a rough estimate, that each coccus, bacillus, diplococcus, or chain in the $\frac{1}{12}$ oil immersion field represents one colony in the $\frac{1}{10000}$ plate from the same sample. It is, of course, impossible to obtain a perfectly even smear, and the sample must be sized up by examining a number of fields. Let the observer find such a representative field, then imagine that instead of looking at a microscopic field through a $\frac{1}{12}$ oil immersion lens he is looking at his $\frac{1}{10000}$ dilution plate, and that each coccus, bacillus, diplococcus, or chain within his vision represents a colony on such a plate; and if he will make the plates also, he will find how closely in the main they agree with his microscopic estimate. That is, in most cases the count of a representative field multiplied by 10,000 gives approximately the number of bacteria per cubic centimeter. Where plates are to be made the microscopic estimate gives an indication of the proper dilution to use. In city inspection only those samples need be plated which are doubtful or above the limit estab-

lished. In this work the plate would corroborate the microscopic findings and strengthen the evidence for court cases.

Table No. I. — Milk.

SAMPLES FROM FEB. 1, 1905, TO FEB. 1, 1906.

| Where obtained. | Number. | Temp. above 50° F. | Count above 500,000 to cubic centimeter. |
|--|---------|-----------------------|--|
| Special samples..... | 407 | Temp. not taken | *10.33% |
| Contractors..... | 4,071 | 6.33% | 12.25% |
| Bottles from wagons (family trade).... | 459 | 5% | 39% |
| Cans from wagons (wholesale trade)... | 276 | 8.25% | 57.75% |
| Stores..... | 346 | 14.25% | 72.75% |
| Totals..... | 5,559 | 6.50% | 19.50% |

*Many of these special samples were purposely taken from milk of high count while testing methods of taking samples.

The above table gives in a striking way the results obtained during the past year in the bacteriological examination of milk.

The figures given are what one familiar with the methods of handling milk might naturally expect; it is especially noticeable that the bacterial content of a milk depends upon its age and the care with which it has been handled. Milk for wholesale trade is rarely handled as carefully as the bottled milk for family trade.

The average householder wishes to have milk delivered in the early morning hours and judges its quality by the depth of the cream line.

In order to satisfy these demands milk which arrives in the city early one morning is kept until the following morning for delivery.

This accounts in great measure for the difference in bacterial content of milk taken as it reaches the contractor and that taken from wagons and stores.

The milk sold to the small storekeeper evidently does not receive as good care in a large number of cases as that bottled for family use.

These facts are particularly unfortunate when one takes into consideration that a large amount of the milk sold by storekeepers is consumed by babies in the tenement house districts.

Table No. II. — Table Showing Source of Milk Samples Collected and Results Obtained on Same Since the Bacteriological Examination of Milk was Started in May, 1904.

| MONTH. | Total Number of Samples. | SAMPLES FROM CONTRACTORS. | | | | SAMPLES FROM WAGONS. | | | | SAMPLES FROM STORES. | | | | SPECIAL SAMPLES. | | | |
|--------------------|--------------------------|---------------------------|--------------------------|--------------------------------|-----------|----------------------|--------------------------|--------------------------------|-----------|----------------------|--------------------------|--------------------------------|-----------|------------------|--------------------------|--------------------------------|-----------|
| | | Number. | Temperature above 50° F. | Count above 500,000 to a c. c. | Infected. | Number. | Temperature above 50° F. | Count above 500,000 to a c. c. | Infected. | Number. | Temperature above 50° F. | Count above 500,000 to a c. c. | Infected. | Number. | Temperature above 50° F. | Count above 500,000 to a c. c. | Infected. |
| June, 1904..... | 539 | 589 | 29.75% | 26.00% | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| July..... | 620 | 620 | 49.50% | 37.50% | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| August..... | 626 | 626 | 57.00% | 23.50% | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| September..... | 609 | 609 | 49.00% | 24.00% | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| October..... | 336 | 336 | 34.00% | 12.00% | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| November..... | 378 | 378 | 14.88% | 9.28% | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| December..... | 186 | 186 | 9.67% | 3.71% | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| January, 1905..... | 192 | 169 | 1.50% | 5.66% | 111.00% | ..... | ..... | ..... | ..... | 33 | 0 | 21.25% | 0 | ..... | ..... | ..... | ..... |
| Totals..... | 3,486 | 3,453 | 35.05% | 18.87% | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

| February, 1906. | 556 | 550 | 1.76% | 7.00% | 15.43% | 0 | ..... | ..... | ..... | 6 | 0 | 33.33% | 0 | ..... | 0 | ..... | ..... |
|------------------------|-------|-------|--------|--------|--------|-----|--------|--------|--------|-----|--------|--------|--------|-------|-----|---------|--------|
| March | 624 | 580 | 3.00% | 11.75% | 16.16% | 4 | 0 | 25.00% | ..... | 39 | 0 | 47.25% | 2.56% | ..... | 1 | 100.00% | ..... |
| April | 503 | 403 | 5.75% | 14.00% | 11.91% | 0 | ..... | ..... | ..... | 21 | 0 | 66.66% | 23.81% | ..... | 79 | 0 | 10.23% |
| May | 566 | 398 | 0.76% | 10.00% | 9.79% | 0 | ..... | ..... | ..... | 0 | ..... | ..... | ..... | ..... | 168 | 123.25% | 6.00% |
| June | 642 | 555 | 18.50% | 20.00% | 15.30% | 0 | ..... | ..... | ..... | 18 | 0 | 78.00% | 16.66% | ..... | 69 | 0 | 13.08% |
| July | 434 | 106 | 1.00% | 37.00% | 12.23% | 197 | 11.50% | 70.50% | 17.75% | 51 | 21.50% | 94.00% | 7.84% | ..... | 80 | 0 | 33.75% |
| August | 261 | 0 | ..... | ..... | ..... | 202 | 10.00% | 48.00% | 18.18% | 55 | 29.00% | 81.75% | 5.45% | ..... | 4 | 0 | ..... |
| September | 216 | 30 | 0 | 0 | 0 | 81 | 3.50% | 53.00% | 3.69% | 104 | 21.00% | 88.50% | 9.60% | ..... | 1 | 100.00% | ..... |
| October | 411 | 268 | 16.75% | 16.00% | 6.71% | 142 | 0.75% | 26.00% | 4.38% | 0 | ..... | ..... | ..... | ..... | 1 | 0 | ..... |
| November | 347 | 217 | 0 | 5.00% | 7.00% | 96 | 0 | 14.50% | 3.19% | 34 | 0 | 32.33% | 0 | ..... | 0 | ..... | ..... |
| December | 397 | 362 | 0.50% | 7.00% | 1.92% | 13 | 0 | 30.00% | 15.38% | 18 | 0 | 50.00% | 0 | ..... | 4 | 25.00% | ..... |
| January, 1906. | 602 | 602 | 9.75% | 8.00% | 5.31% | 0 | ..... | ..... | ..... | 0 | ..... | ..... | ..... | ..... | 0 | ..... | ..... |
| Totals | 5,569 | 4,071 | 6.33% | 12.25% | 10.83% | 735 | 6.25% | 46.00% | 11.60% | 346 | 14.25% | 73.75% | 7.50% | ..... | 407 | 10.33% | 9.39% |

* Temperatures not taken.

† Examination for infected milk began in January, 1905.

‡ High count samples purposely taken for special tests.

A comparison of the figures obtained during 1904 with those obtained during the corresponding months of 1905 are of considerable interest in showing the improvement which has taken place in the quality of the milk. A comparison of the results obtained during the same month on milks obtained from different sources is also very instructive.

Table No. III. — Table Showing Results on Milk Containing Pus or Streptococci, or Both.

| DATE. | Total Number of Samples. | SAMPLES FROM CONTRACTORS. | | | | SAMPLES FROM WAGONS. | | | | SAMPLES FROM STORES. | | | | SPECIAL SAMPLES. | | | |
|----------------------|--------------------------|---------------------------|-------|---------------|-----------------------|----------------------|-------|---------------|-----------------------|----------------------|-------|---------------|-----------------------|------------------|--------|---------------|-----------------------|
| | | Number. | Pus. | Streptococci. | Pus and Streptococci. | Number. | Pus. | Streptococci. | Pus and Streptococci. | Number. | Pus. | Streptococci. | Pus and Streptococci. | Number. | Pus. | Streptococci. | Pus and Streptococci. |
| February, 1905 | 556 | 550 | 4.90% | 8.72% | 1.81% | 0 | ..... | ..... | 0 | 6 | 0 | 0 | 0 | 0 | ..... | ..... | ..... |
| March | 624 | 580 | 6.36% | 7.57% | 2.23% | 4 | 0 | 0 | 0 | 39 | 0 | 2.54% | 0 | 1 | 0 | 0 | 0 |
| April | 503 | 403 | 4.21% | 6.70% | 1.00% | 0 | ..... | ..... | ..... | 21 | 0 | 23.81% | 0 | 79 | 7.60% | 2.63% | 0 |
| May | 566 | 398 | 4.52% | 4.62% | 0.75% | 0 | ..... | ..... | ..... | 0 | ..... | ..... | ..... | 168 | 6.00% | 0 | 0 |
| June | 642 | 555 | 8.46% | 6.12% | 0.72% | 0 | ..... | ..... | ..... | 18 | 0 | 16.66% | 0 | 69 | 11.69% | 1.45% | 0 |
| July | 434 | 106 | 5.63% | 6.60% | 0 | 197 | 8.12% | 5.07% | 4.56% | 51 | 3.92% | 3.92% | 0 | 80 | 13.75% | 0 | 0 |
| August | 261 | 0 | ..... | ..... | ..... | 202 | 7.49% | 9.09% | 1.60% | 55 | 5.45% | 0 | 0 | 4 | 0 | 0 | 0 |
| September | 216 | 30 | 0 | 0 | 0 | 81 | 1.23% | 1.23% | 1.23% | 104 | 4.80% | 4.80% | 0 | 1 | 0 | 0 | 0 |
| October | 411 | 268 | 5.60% | 0.74% | 0.87% | 142 | 2.82% | 2.11% | 0 | 0 | ..... | ..... | ..... | 1 | 0 | 0 | 0 |
| November | 347 | 217 | 3.27% | 1.40% | 2.33% | 96 | 0 | 3.12% | 0 | 34 | 0 | 0 | 0 | 0 | ..... | ..... | ..... |
| December | 397 | 362 | 1.92% | 0 | 0 | 13 | 0 | 15.38% | 0 | 18 | 0 | 0 | 0 | 4 | 0 | 0 | 0 |
| January, 1906 | 602 | 602 | 3.16% | 1.66% | 0.60% | 0 | ..... | ..... | ..... | 0 | ..... | ..... | ..... | 0 | ..... | ..... | ..... |
| Totals | 5,559 | 4,071 | 4.92% | 4.82% | 1.06% | 735 | 4.86% | 5.00% | 1.80% | 346 | 2.87% | 4.62% | 0 | 407 | 8.60% | 0.79% | 0 |

The small percentage of pus found in store milk is due to the fact that this is usually a mixed milk, while samples from contractors and from wagons are usually from single dairies. There is a larger percentage of pus in "special samples," because many samples from suspected cows are included in this list, examinations being made on request from dairies which had been condemned, in order to find out and eliminate the cow at fault.

SPECIAL INVESTIGATIONS.

Acting in accordance with instructions from the Board, the following inspections, investigations and analyses were made during the year:

Keeping of Lobster "Floats" in Polluted Water.

During June, one of the large piers on the water front was visited by Mr. Jordan, Chief Sanitary Inspector, and Dr. Hill, the former director of the laboratory. Lobster tanks, or floats, were found moored near sewer outlets. Subsequent tests at the laboratory on lobsters seized from these floats showed the presence of sewage organisms in the intestines and meat.

Nevertheless, the various methods of cooking lobsters are such that, however objectionable the practice of keeping lobsters in such water may be, typhoid and allied diseases could hardly be caused by eating such food, since all such organisms would undoubtedly be killed in the cooking.

Wall Papers as Infecting Agents.

A question as to the danger of wall papers, once infected, acting as infecting agents, having been referred to this laboratory, a number of experiments were undertaken as follows:

1. Two rooms just vacated by persons who had been sick in bed for two weeks or more with diphtheria were visited, and the wall paper near the head-boards rubbed with sterile swabs. A total of 178 swabs were used. Of the serum cultures made from these, three showed morphologically typical diphtheria bacilli. These organisms were isolated and were later found to be non-virulent. Spore bearing bacilli were abundant on many of the cultures.

2. Wall papers of different kinds were artificially infected in the laboratory by spraying with a bouillon culture of diphtheria bacilli, and exposed to diffuse light, swabs being taken and serum cultures being made at intervals. After twenty-four hours' exposure, but four out of twelve swabs showed diphtheria bacilli, and thereafter it was impossible to find *B. diphtheriæ*. Spore bearing bacilli were abundant on practically all of the cultures made.

3. Paste obtained from a paper hanger was found to have a very deleterious effect on diphtheria bacilli and water bacteria. The only organisms remaining alive after twenty-four hours in paste diluted with tap water and bouillon cultures of diphtheria were spore bearing bacilli and moulds.

4. A sample of paper composed of many layers of wall paper was torn apart and cultures taken from between the

layers. Five out of six cultures remained sterile, the sixth developing a few colonies.

From the above experiments and from the experiments conducted in 1902, in rooms occupied by tuberculosis and diphtheria patients, it seems fair to conclude that paper hangers run little or no danger in removing paper from walls, and that the practice of repapering over old wall papers is unobjectionable from a bacteriological standpoint.

Drawn versus Undrawn Fowl.

With Dr. Burr, veterinarian to the Board, a few experiments were undertaken on a number of fowl which had been kept in cold storage for a limited period of time, some drawn and others undrawn. As far as we were able to judge from the few experiments conducted the undrawn fowl keep better than drawn under similar conditions. The amount of work done was hardly sufficient to warrant any very definite conclusions, but indicated the necessity of more experimental evidence on the subject, especially in view of certain published statements on the subject which are apparently supported by little or no experimental data.

Miscellaneous Tests.

In addition to the above, inspections and special tests were made and reported on as follows:

Chemical analyses of eight samples of chloride of lime, and twenty samples of formaldehyde solution for percentage strength.

Analysis of three samples of wall paper for the presence of arsenic. All three samples gave negative results.

Analysis of crop of fowl, etc., for presence of corrosive poisons. Results, negative.

Analysis of several samples of meat for the presence of preservatives. Results, all negative.

Bacteriological examination of a sample of ice and a sample of water for the presence of sewage organisms. Results, negative.

Bacteriological examination of water from a suspected well for the presence of sewage organisms. Results, positive. This evidence of pollution was later confirmed by chemical tests.

Inspection of the sanitary arrangements of one of the ocean liners about which complaint had been made.

Inspection of house recently disinfected to determine if spots on furniture and fabrics were due to disinfectants used. Results of analysis, negative.

SPECIAL INFORMATION REGARDING LABORATORY.

The attention of physicians is specifically called to the following information and rules :

Outfits and Specimens.

1. The use of the outfits supplied by the laboratory and obtainable from all culture stations is particularly requested. In the case of tuberculosis indiscriminate outfits are not received.

2. Diphtheria outfits containing dried or contaminated serum and other outfits, unused or with parts missing, should not be thrown away, but should be returned to the laboratory.

Culture Stations.

1. Three new culture stations have been added during the year: Staples & Towse, Oak square, Brighton; Fallon's, Mattapan square; and Harris Bros., Edward Everett square.

2. Culture stations are not allowed to make trips other than the regular trip which is made immediately after the closing hour for receiving cultures.

Reports.

1. Positive results from diphtheria diagnosis cultures are telephoned immediately the result is obtained. All other reports are sent out by mail, but telephone reports may be obtained by calling up the laboratory (Back Bay 1500) not earlier than 10 A.M. for diphtheria or 11 A.M. for other reports.

2. If streptococci are present in abundance in cultures for diagnosis their presence is noted on the report.

3. Physicians should be careful to fill out the cards completely. If a physician neglects to state whether the culture is for diagnosis or release, fails to give his address or writes illegibly, delay is caused in getting out the report.

Antitoxin and Vaccine.

The laboratory acts as an antitoxin and vaccine station for the State Board of Health.

Respectfully submitted,

HIBBERT WINSLOW HILL, M.D.,

Director to August 31, 1905.

BURT RANSOM RICKARDS, S.B.,

Director from September 1, 1905.

REPORT OF MEDICAL INSPECTOR.

To the Board of Health :

GENTLEMEN, — I have the honor to submit the following report for the year ending December 31, 1905 :

INFECTIOUS DISEASES.

Variola. — There were five cases of variola in this city and one death.

Diphtheria. — There were one thousand five hundred fifty (1,550) cases reported; eight hundred thirty-two (832) of these were cared for at the South Department of the City Hospital, 53.67 per cent. There were one hundred thirty-two (132) deaths. Mortality, 8.51 per cent.

Scarlet Fever. — There were one thousand one hundred thirty-one (1,131) cases reported; five hundred eighty (580) of these were cared for at the South Department of the Boston City Hospital, 51.28 per cent. There were forty-four deaths. Mortality, 3 per cent.

Measles. — There were one thousand nine hundred eighty three (1,983) cases reported and fifty-four (54) deaths. Mortality, 2.7 per cent.

Typhoid Fever. — There were eight hundred forty-eight (848) cases reported; five hundred sixty-four (564) were cared for at the different hospitals in the city. There were one hundred seventeen (117) deaths. Mortality, 13.79 per cent.

Tuberculosis. — There were one thousand five hundred sixty-three (1,563) cases reported. There were one thousand one hundred ninety-four (1,194) deaths, six hundred five (605) of which had never been reported by any physician or institution.

Ophthalmia. — There were sixteen cases reported.

Cerebro-Spinal Meningitis. — There were one hundred sixty-two (162) cases reported and one hundred forty-two (142) deaths. Mortality, 87 per cent.

During the past year, four hundred and seven persons died without a physician in attendance, and were reported to this office. In all these cases a personal visit was made, the body examined, and a probable diagnosis made before granting a

permit for burial. Fifty cases were referred to the medical examiner for investigation.

A tabular statement of the cases investigated is appended.

Tabular Statement of the Cause of Deaths Investigated by the Medical Inspector for the Year ending December 31, 1905.

| BERTILLON CLASSIFICATION. | January. | February. | March. | April. | May. | June. | July. | August. | September. | October. | November. | December. | Total. |
|---|----------|-----------|--------|--------|------|-------|-------|---------|------------|----------|-----------|-----------|--------|
| I. General Diseases. | | | | | | | | | | | | | |
| Varicella | | | | 1 | | | | | | | | | 1 |
| Diphtheria and croup | | 2 | | 1 | | | | | | | | 1 | 4 |
| Scarlet Fever | | | | | 1 | | | | | | | | 1 |
| Dysentery | | | | | | | | 2 | | | | | 2 |
| Tuberculosis of lungs | 1 | 6 | 3 | 4 | 2 | 1 | 2 | 2 | 2 | 1 | 2 | 2 | 28 |
| Cancer of breast | | | 1 | | 1 | | | | | | | | 2 |
| Cancer of uterus | | | | | | | 1 | | | | | | 1 |
| " others | 1 | | | | | | | | | | | | 1 |
| Diabetes | 1 | 1 | | 1 | | 1 | 1 | | | | | | 4 |
| Total from general diseases .. | 2 | 9 | 4 | 7 | 4 | 2 | 4 | 4 | 2 | 1 | 2 | 3 | 44 |
| II. Diseases of the Nervous System and of the Organs of Sense. | | | | | | | | | | | | | |
| Simple meningitis | 1 | | 1 | | 1 | | | 1 | | 1 | | 1 | 6 |
| Cerebral hemorrhage and congestion | 2 | 5 | | | | | | 2 | 1 | 1 | 1 | 1 | 13 |
| Abscess of Brain | | | 1 | | | | | | | | | | 1 |
| Convulsions of infants | 2 | 2 | 1 | 1 | 1 | | | 1 | | 4 | 1 | | 13 |
| Acute Mania | | | | | | | | 1 | | | | | 1 |
| Other diseases of the nervous system | 1 | | | | | | | | | | | | 1 |
| Total of the nervous system | 6 | 7 | 3 | 1 | 2 | | | 5 | 1 | 6 | 2 | 2 | 35 |
| III. Diseases of the Circulatory System. | | | | | | | | | | | | | |
| Organic diseases of the heart, | 8 | 6 | 7 | 7 | 8 | 7 | 7 | 7 | 5 | 5 | 7 | 10 | 84 |
| Hemorrhage | | 1 | | | | | | | | | | | 1 |
| Endocarditis | | 2 | | | | | | | | | | | 2 |
| Angina Pectoris | | | 1 | | | | | | | | | | 1 |
| Other diseases of the circulatory system | 1 | | | | 1 | | | 1 | | | | | 3 |
| Total of the circulatory system | 9 | 9 | 8 | 7 | 9 | 7 | 7 | 8 | 5 | 5 | 7 | 10 | 91 |
| Carried forward | 17 | 25 | 15 | 15 | 15 | 9 | 11 | 17 | 8 | 12 | 11 | 15 | 170 |

STATEMENT OF THE CAUSE OF DEATHS.— *Continued.*

| BERTILLON CLASSIFICATION. | January. | February. | March. | April. | May. | June. | July. | August. | September. | October. | November. | December. | Total. |
|--|----------|-----------|--------|--------|------|-------|-------|---------|------------|----------|-----------|-----------|--------|
| <i>Brought forward.....</i> | 17 | 25 | 15 | 15 | 15 | 9 | 11 | 17 | 8 | 12 | 11 | 15 | 170 |
| IV. Diseases of the Respiratory System. | | | | | | | | | | | | | |
| Acute bronchitis | 1 | 2 | 1 | 1 | .... | 2 | .... | .... | .... | .... | 1 | 2 | 10 |
| Chronic bronchitis ..... | .... | .... | 1 | 2 | 1 | .... | .... | 1 | .... | 1 | .... | .... | 6 |
| Pneumonia..... | 7 | 5 | 4 | 2 | 1 | .... | 1 | .... | 1 | .... | .... | 2 | 23 |
| Broncho pneumonia | 1 | .... | .... | .... | 1 | .... | .... | .... | 2 | .... | .... | .... | 4 |
| Pul. hemorrhage..... | .... | .... | .... | .... | 2 | .... | .... | .... | .... | .... | .... | .... | 2 |
| Total of the respiratory system | 9 | 7 | 6 | 5 | 5 | 2 | 1 | 1 | 3 | 1 | 1 | 4 | 45 |
| V. Diseases of the Digestive System. | | | | | | | | | | | | | |
| Infantile diarrhœa and athrepsia ..... | .... | .... | .... | .... | .... | 1 | 11 | 7 | 8 | 3 | 1 | .... | 31 |
| Gastritis ..... | .... | .... | .... | .... | .... | 1 | .... | .... | .... | .... | .... | .... | 1 |
| Total of the digestive system ..... | .... | .... | .... | .... | .... | 2 | 11 | 7 | 8 | 3 | 1 | .... | 32 |
| VI. Diseases of the Genito-Urinary System and Adnexa. | | | | | | | | | | | | | |
| Acute nephritis ..... | .... | .... | .... | 1 | .... | .... | .... | .... | .... | 1 | 1 | .... | 3 |
| Bright's disease..... | .... | 1 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 1 |
| Total of the genito-urinary system ..... | .... | 1 | .... | 1 | .... | .... | .... | .... | .... | 1 | 1 | .... | 4 |
| VII. Puerperal Condition. | | | | | | | | | | | | | |
| Other accidents of labor..... | .... | .... | .... | .... | .... | 1 | .... | .... | .... | .... | .... | .... | 1 |
| Total puerperal condition.. | .... | .... | .... | .... | .... | 1 | .... | .... | .... | .... | .... | .... | 1 |
| VIII. Diseases of the Skin and Cellular Tissue. | | | | | | | | | | | | | |
| Phlegmon, acute abscess..... | .... | .... | .... | .... | 1 | .... | .... | .... | .... | .... | .... | .... | 1 |
| Total of the skin and tissue cellular ..... | .... | .... | .... | .... | 1 | .... | .... | .... | .... | .... | .... | .... | 1 |
| No deaths were examined in the classifications of IX. and X..... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... |
| <i>Carried forward.....</i> | 26 | 33 | 21 | 21 | 21 | 14 | 23 | 25 | 19 | 17 | 14 | 19 | 253 |

STATEMENT OF THE CAUSE OF DEATHS.— *Concluded.*

| BERTILLON CLASSIFICATION. | January. | February. | March. | April. | May. | June. | July. | August. | September. | October. | November. | December. | Total. |
|---|----------|-----------|--------|--------|------|-------|-------|---------|------------|----------|-----------|-----------|--------|
| <i>Brought forward</i> | 26 | 33 | 21 | 21 | 21 | 14 | 23 | 25 | 19 | 17 | 14 | 19 | 253 |
| XI. Infantile. | | | | | | | | | | | | | |
| Congenital debility, icterus and scleroma..... | 2 | 1 | 3 | .... | 1 | .... | 2 | 1 | 4 | 4 | 3 | 3 | 24 |
| Other diseases peculiar to infancy..... | 1 | .... | .... | 2 | 1 | .... | .... | 1 | .... | 1 | .... | .... | 6 |
| Total infantile..... | 3 | 1 | 3 | 2 | 2 | .... | 2 | 2 | 4 | 5 | 3 | 3 | 30 |
| XII. Old Age. | | | | | | | | | | | | | |
| Senile debility..... | 2 | 1 | 2 | 2 | 2 | 1 | 2 | 1 | 1 | 2 | 1 | 3 | 20 |
| Total from old age..... | 2 | 1 | 2 | 2 | 2 | 1 | 2 | 1 | 1 | 2 | 1 | 3 | 20 |
| XIII. External Violence. | | | | | | | | | | | | | |
| Other accidental injuries..... | 1 | .... | .... | .... | 1 | 1 | 1 | .... | .... | .... | .... | .... | 4 |
| Heat prostration..... | .... | .... | .... | .... | .... | .... | 1 | .... | .... | .... | .... | .... | 1 |
| Total from external vio- lence..... | 1 | .... | .... | .... | 1 | 1 | 2 | .... | .... | .... | .... | .... | 5 |
| XIV. Ill-Defined Diseases. | | | | | | | | | | | | | |
| Unknown or not specified diseases..... | 3 | 6 | 3 | 3 | 1 | 1 | .... | 1 | 4 | 5 | 2 | 6 | 35 |
| Total ill-defined diseases... | 3 | 6 | 3 | 3 | 1 | 1 | .... | 1 | 4 | 5 | 2 | 6 | 35 |
| Still-births..... | 2 | .... | 2 | 3 | 1 | .... | .... | 2 | 1 | 3 | .... | .... | 14 |
| Referred to medical exam- iner..... | 3 | 4 | 2 | 3 | 1 | 2 | 5 | 6 | 6 | 7 | 5 | 6 | 50 |
| Total..... | 40 | 45 | 33 | 34 | 29 | 19 | 34 | 37 | 35 | 39 | 25 | 37 | 407 |

Respectfully submitted,

DAVID D. BROUGH,
Medical Inspector.

REPORT OF GEORGE A. SARGENT, M.D.

January 1, 1906.

To the Board of Health:

GENTLEMEN, — I have the honor to present the following report:

There have been vaccinated at Chardon street, during the past year, 2,402 persons; 1,056 certificates of vaccination have been issued. The Chardon-street Home has been visited.

At the Suffolk County Jail 2,052 cases were treated and 4,667 visits were made.

Respectfully submitted,

GEORGE A. SARGENT, M.D.

Tabular Statement of the Diseases Treated at Suffolk County Jail for the Year Ending December 31, 1905.

| DISEASES. | Remaining Jan. 1, 1906. | Treated during Year. | Recovered. | Improved. | Sent to Hospital for Insane. | Discharged from Custody. | Died. | Remaining Dec. 31, 1905. |
|---|----------------------------|-------------------------|------------|-----------|---------------------------------|-----------------------------|-------|-----------------------------|
| General Diseases: | | | | | | | | |
| Cold | | 112 | 112 | | | | | |
| Debility | | 13 | | 13 | | | | |
| Fever, intermittent. . . | | 8 | 8 | | | | | |
| Rheumatism | | 72 | 5 | 67 | | | | |
| Rheumatoid Arthritis. . | | 1 | | | | 1 | | |
| Tuberculosis..... | | 3 | | | | 3 | | |
| Functional Diseases of Nervous System: | | | | | | | | |
| Delirium Tremens. | | 128 | 128 | | | | | 2 |
| Epilepsy | | 4 | | | | 4 | | |
| Neuralgia | | 120 | 120 | | | | | |
| <i>Carried forward.....</i> | | 461 | 371 | 80 | | 8 | | 2 |

STATEMENT OF THE DISEASES TREATED. — *Continued.*

| DISEASES. | Remaining Jan. 1, 1906. | Treated during the year. | Recovered. | Improved. | Sent to Hospital for Insane. | Discharged from Custody. | Died. | Remaining Dec. 31, 1906. |
|-------------------------------------|----------------------------|-----------------------------|------------|-----------|---------------------------------|-----------------------------|-------|-----------------------------|
| <i>Brought forward</i> | | 461 | 371 | 80 | ..... | 8 | ..... | 2 |
| Organic Diseases of Nervous System: | | | | | | | | |
| Meningitis..... | | 1 | ..... | ..... | ..... | ..... | 1 | ..... |
| Progressive Muscular Atrophy..... | | 1 | ..... | ..... | ..... | 1 | ..... | ..... |
| Diseases of Intellect: | | | | | | | | |
| Acute Mania..... | | 1 | ..... | ..... | ..... | ..... | 1 | ..... |
| Dementia..... | | 9 | ..... | ..... | 9 | ..... | ..... | ..... |
| Diseases of Heart: | | | | | | | | |
| Myocarditis..... | | 3 | ..... | ..... | ..... | 1 | 2 | ..... |
| Diseases of Bronchi: | | | | | | | | |
| Asthma..... | | 6 | ..... | 6 | ..... | ..... | ..... | ..... |
| Bronchitis, acute..... | | 27 | 27 | ..... | ..... | ..... | ..... | ..... |
| Diseases of Lungs: | | | | | | | | |
| Pleurisy..... | | 1 | ..... | 1 | ..... | ..... | ..... | ..... |
| Pneumonia..... | | 3 | ..... | ..... | ..... | ..... | 3 | ..... |
| Diseases of Glands: | | | | | | | | |
| Adenitis..... | | 5 | ..... | 5 | ..... | ..... | ..... | ..... |
| Diseases of Fauces: | | | | | | | | |
| Pharyngitis..... | | 12 | 12 | ..... | ..... | ..... | ..... | ..... |
| Post-nasal catarrh..... | | 2 | ..... | 2 | ..... | ..... | ..... | ..... |
| Stomatitis..... | | 13 | 13 | ..... | ..... | ..... | ..... | ..... |
| Tonsillitis, acute..... | | 1 | 1 | ..... | ..... | ..... | ..... | ..... |
| Tonsillitis, follicular..... | | 6 | 6 | ..... | ..... | ..... | ..... | ..... |
| Diseases of Larynx: | | | | | | | | |
| Laryngitis..... | | 2 | 2 | ..... | ..... | ..... | ..... | ..... |
| Diseases of Kidneys: | | | | | | | | |
| Nephritis..... | | 1 | ..... | ..... | ..... | 1 | ..... | ..... |
| Diseases of Digestive System: | | | | | | | | |
| Colic..... | | 5 | 5 | ..... | ..... | ..... | ..... | ..... |
| Constipation..... | | 653 | 653 | ..... | ..... | ..... | ..... | ..... |
| Diarrhoea..... | | 132 | 132 | ..... | ..... | ..... | ..... | ..... |
| Dyspepsia..... | | 84 | ..... | 84 | ..... | ..... | ..... | ..... |
| <i>Carried forward</i> | | 1,429 | 1,222 | 178 | 9 | 11 | 7 | 2 |

STATEMENT OF THE DISEASES TREATED.—*Continued.*

| DISEASES. | Remaining Jan. 1, 1905. | Treated during the year. | Recovered. | Improved. | Sent to Hospital for Insane. | Discharged from Custody. | Died. | Remaining Dec. 31, 1905. |
|--------------------------------------|----------------------------|-----------------------------|------------|-----------|---------------------------------|-----------------------------|-------|-----------------------------|
| <i>Brought forward</i>..... | ..... | 1,429 | 1,222 | 178 | 9 | 11 | 7 | 2 |
| Functional Diseases of Women: | | | | | | | | |
| Dysmenorrhœa..... | ..... | 2 | ..... | 2 | ..... | ..... | ..... | ..... |
| Menorrhagia..... | ..... | 7 | ..... | 7 | ..... | ..... | ..... | ..... |
| Metrorrhagia..... | ..... | 1 | ..... | 1 | ..... | ..... | ..... | ..... |
| Diseases of Cutaneous System: | | | | | | | | |
| Acne..... | ..... | 3 | 3 | ..... | ..... | ..... | ..... | ..... |
| Clavus..... | ..... | 1 | 1 | ..... | ..... | ..... | ..... | ..... |
| Dermatitis..... | ..... | 10 | 10 | ..... | ..... | ..... | ..... | ..... |
| Eczema..... | ..... | 14 | ..... | 14 | ..... | ..... | ..... | ..... |
| Furuncle..... | ..... | 6 | 6 | ..... | ..... | ..... | ..... | ..... |
| Paronychia..... | ..... | 4 | 4 | ..... | ..... | ..... | ..... | ..... |
| Phthiriasis..... | ..... | 39 | 39 | ..... | ..... | ..... | ..... | ..... |
| Scabies..... | 3 | 80 | 82 | ..... | ..... | ..... | ..... | 1 |
| Tinea Circinata..... | ..... | 2 | 2 | ..... | ..... | ..... | ..... | ..... |
| Urticaria..... | ..... | 1 | 1 | ..... | ..... | ..... | ..... | ..... |
| Verruca..... | ..... | 2 | 2 | ..... | ..... | ..... | ..... | ..... |
| Diseases of Eye: | | | | | | | | |
| Conjunctivitis..... | ..... | 13 | 13 | ..... | ..... | ..... | ..... | ..... |
| Hordeolum..... | ..... | 2 | 2 | ..... | ..... | ..... | ..... | ..... |
| Trichiosis..... | ..... | 1 | ..... | 1 | ..... | ..... | ..... | ..... |
| Poisons: | | | | | | | | |
| Lead poisoning..... | ..... | 1 | ..... | ..... | ..... | 1 | ..... | ..... |
| Opium habit..... | ..... | 19 | 9 | 10 | ..... | ..... | ..... | ..... |
| New Growths: | | | | | | | | |
| Fibroma..... | ..... | 1 | ..... | ..... | ..... | 1 | ..... | ..... |
| Surgical Diseases: | | | | | | | | |
| Abscess..... | ..... | 22 | 22 | ..... | ..... | ..... | ..... | ..... |
| Bursitis..... | ..... | 1 | 1 | ..... | ..... | ..... | ..... | ..... |
| Chronic ulcer..... | ..... | 14 | ..... | 14 | ..... | ..... | ..... | ..... |
| Epididymitis..... | ..... | 1 | ..... | 1 | ..... | ..... | ..... | ..... |
| Erysipelas..... | ..... | 1 | 1 | ..... | ..... | ..... | ..... | ..... |
| Felon..... | ..... | 5 | 5 | ..... | ..... | ..... | ..... | ..... |
| <i>Carried forward</i> | 3 | 1,682 | 1,425 | 228 | 9 | 13 | 7 | 3 |

STATEMENT OF THE DISEASES TREATED. — *Concluded.*

| DISEASES. | Remaining Jan. 1, 1906. | Treated during the year. | Recovered. | Improved. | Sent to Hospital for Insane. | Discharged from Custody. | Died. | Remaining Dec. 31, 1906. |
|------------------------------|----------------------------|-----------------------------|------------|-----------|---------------------------------|-----------------------------|-------|-----------------------------|
| <i>Brought forward</i> | 8 | 1,682 | 1,425 | 228 | 9 | 13 | 7 | 8 |
| Flat foot..... | | 1 | | 1 | | | | |
| Gonorrhœa..... | 5 | 69 | 35 | 39 | | | | |
| Hæmorrhoids..... | | 2 | | 2 | | | | |
| Hernia..... | | 1 | | 1 | | | | |
| Leucorrhœa..... | 1 | 6 | | 7 | | | | |
| Mastitis..... | | 1 | 1 | | | | | |
| Otitis..... | | 13 | | 13 | | | | |
| Stricture..... | | 3 | | 3 | | | | |
| Synovitis..... | | 2 | 2 | | | | | |
| Syphilis..... | 4 | 37 | | 39 | | | | 2 |
| Injuries: | | | | | | | | |
| Abrasions..... | | 39 | 39 | | | | | |
| Burns..... | | 11 | 11 | | | | | |
| Contusions..... | | 30 | 30 | | | | | |
| Fractures..... | | 12 | | 12 | | | | |
| Frost-bite..... | | 2 | 2 | | | | | |
| Sprains..... | | 16 | 16 | | | | | |
| Wounds: | | | | | | | | |
| Inclised..... | | 12 | 12 | | | | | |
| Lacerated..... | | 30 | 29 | | | | | 1 |
| Scalp..... | | 60 | 59 | | | | | 1 |
| Total | 18 | 2,029 | 1,661 | 345 | 9 | 13 | 7 | 7 |
| Malingering | | 10 | 10 | | | | | |
| Grand total | 18 | 2,039 | 1,677 | 345 | 9 | 13 | 7 | 7 |

REPORT OF INSPECTOR OF ANIMALS.

BOSTON, February 1, 1905.

To the Board of Health:

GENTLEMEN,— I have the honor to submit the following report of the contagious diseases among animals, the inspection of animals kept for the production of milk within the city, the inspection of animals and dressed meat at the Brighton Abattoir, and the inspection of provisions, for the year ending January 31, 1906.

ANIMALS KILLED AT ABATTOIR.

| | |
|------------------------|---------------|
| Cattle | 30,413 |
| Calves | 12,429 |
| Sheep | 2,505 |
| Swine | 23,821 |
| Total | 69,168 |

Table No. 1.

ANIMALS CONDEMNED.

| | Number. | Weight (Pounds). |
|---|------------|---------------------|
| Cows..... | 107 | 45,370 |
| Steers..... | 0 | ..... |
| Bulls..... | 1 | 450 |
| Calves..... | 3 | 159 |
| Sheep..... | 18 | 807 |
| Swine..... | 34 | 5,502 |
| Parts of animals, including 1,065 livers..... | ..... | 12,662 |
| Total..... | 163 | 64,350 |

“Parts of animals,” in the above table, refers to animals where only a part of the same was condemned, the unmarketable portion being confined to the parts about the local lesion.

Table No. II.

DISEASES FOUND AMONG ANIMALS AFTER HAVING BEEN KILLED AND DRESSED AT THE ABATTOIR NECESSITATING THE CONDEMNING OF THE CARCASSES.

| DISEASES. | Cattle. | Calves. | Sheep. | Swine. |
|-------------------|---------|---------|--------|--------|
| Tuberculosis..... | 93 | ..... | ..... | 11 |
| Septicemia | 13 | 3 | 18 | 15 |
| Pneumonia..... | 2 | ..... | ..... | ..... |
| Cholera..... | ..... | ..... | ..... | 8 |
| Totals..... | 108 | 3 | 18 | 34 |

Table No. III.

ANIMALS RECEIVED DEAD FROM THE STOCK-YARDS TO BE DRESSED FOR FOOD.

| ANIMALS. | Number Received. | Number Condemned. | Weight. |
|-------------|------------------|-------------------|---------|
| Cows | 65 | 12 | 4,863 |
| Steers..... | 7 | ..... | ..... |
| Bull..... | 0 | ..... | ..... |
| Totals..... | 72 | 12 | 4,863 |

The above table refers to animals arriving at the different stock-yards which were unable to walk to the abattoir because of injury during transportation, or from what was supposed to be a slight illness; these were shot at the stock-yards and carted to the abattoir in the ambulance.

Of the above seventy-two animals, forty-two were found to be slightly injured, nine had fracture of a leg, nine were pregnant, eleven had septicemia, and one had pneumonia, the last twelve being condemned.

ACTINOMYCOSIS.

There were found at the abattoir during the past year twenty-four cases of actinomycosis, all of which showed only local lesions about the head, and in these cases the heads and tongues were condemned.

TUBERCULOSIS.

The following table shows the number of cases of tuberculosis in cattle killed at the abattoir:

Table No. IV.

| CLASS OF ANIMALS. | Number Received. | Number Tubercular. |
|---|------------------|--------------------|
| Whole number of all kinds (cattle)..... | 30,413 | 234 |
| Cows from Eastern States..... | 6,547 | 232 |
| Bulls from Eastern States..... | 1,814 | 2 |
| Cows from Western States..... | 13,479 | ..... |
| Steers from Western States..... | 8,575 | ..... |
| Steers from Eastern States..... | ..... | ..... |
| Swine..... | 23,821 | 468 |

Under the head of "Cows from Eastern States" is included animals from all of the New England States.

By comparing the above table with table under the head of "Diseases found among animals after having been killed," etc., it will be seen that only 93 of the 234 cases of tuberculosis were condemned. This means that 141 of these cases were slight, and not condemnable under the act passed by the Legislature of 1898.

INSPECTION OF CATTLE.

The inspection of cattle kept for the production of milk within the city limits has been continued as heretofore. All cattle that have, upon physical examination, shown any symptoms of tuberculosis, have been subjected to the tuberculin test. Fifteen animals were found tuberculous, quarantined, and reported to the State Cattle Bureau as required by the Revised Laws. The barns occupied by these animals were disinfected by the Board of Health.

The use of milk from all cows which upon examination showed any disease of the udder was prohibited.

GLANDERS.

There have been reported to the Board of Health by veterinarians during the past year 261 suspicious cases of glanders. Of these, 74 horses on examination were found to be affected with some non-contagious disease, and the remaining 187 with glanders. Eleven of these cases upon inquiry were found to have been owned and stabled outside of Boston, or had been stabled in Boston for so short a time that no doubt existed but that the animals were

infected with glanders before coming to Boston. The State Cattle Bureau was notified of such cases, that an investigation might be made by them.

In addition to the above cases of glanders reported to this office, the Board of Health, by examining all animals in stables where a case of glanders has occurred, and also in many other stables, found twenty-one cases of glanders, or ten per cent. of the total number of cases, all of which would otherwise have remained in such stables a constant danger to the other animals for some time before being discovered by the owner.

The following table shows the number of cases of glanders for each month during the past year :

Table No. V.

| MONTH. | Cases reported. | Cases found by Board of Health. | Cases found which belonged in some other city. | Cases which upon examination were found not to be glanders. | Actual number of cases of glanders found in city. | Number of cases of glanders which belong in Boston. | Number of stables in which glanders was found. |
|----------------|-----------------|---------------------------------|--|---|---|---|--|
| January..... | 27 | 4 | 1 | 3 | 28 | 27 | 22 |
| February | 25 | 3 | ..... | 7 | 21 | 21 | 19 |
| March | 27 | 3 | 1 | 10 | 20 | 19 | 21 |
| April..... | 31 | 1 | ..... | 9 | 23 | 23 | 23 |
| May..... | 18 | 1 | 1 | 5 | 14 | 13 | 13 |
| June..... | 15 | 2 | 1 | 5 | 12 | 11 | 13 |
| July | 21 | 2 | 3 | 8 | 15 | 12 | 14 |
| August | 21 | ..... | 1 | 7 | 14 | 13 | 12 |
| September.. .. | 21 | ..... | 1 | 3 | 18 | 17 | 19 |
| October..... | 18 | 2 | ..... | 6 | 14 | 14 | 14 |
| November..... | 18 | 1 | 2 | 4 | 15 | 13 | 15 |
| December..... | 19 | 2 | ..... | 7 | 14 | 14 | 14 |
| Total | 261 | 21 | 11 | 74 | 208 | 197 | 199 |

All stables in which glanders occurred during the past year have been disinfected.

For a number of years the Board of Health has had similar arrangements, as in diphtheria, for the collection of specimens to be examined for glanders. Veterinarians having cases of doubtful character from which they desire a guinea pig test for glanders are encouraged by the Board of

Health to take advantage of this opportunity and send a specimen of the suspected matter (as discharge from nose, an ulcer, or an abscess) to the Board of Health laboratory to be tested. Upon making a diagnosis a report will at once be made to the veterinarian sending the specimen.

Veterinarians are also encouraged to use mallein as an aid to them in the diagnosis of glanders, and, for this reason, the Board of Health has, for some time, been ready to supply mallein.

RABIES.

Two cases of suspected rabies in dogs have been reported to the Board of Health during the past year. Both of these dogs, upon examination, were found not to be rabid.

INSPECTION OF PROVISIONS.

The following articles of food, seized in markets and stores, have been condemned :

| | |
|---|---------------|
| Beef, tainted | 2,165 pounds. |
| Veal, tainted | 1,353 " |
| Veal, immatured | 21,284 " |
| Mutton, tainted | 674 " |
| Pork, tainted | 1,285 " |
| Poultry, tainted | 18,704 " |
| Eggs, decayed | 645 dozen. |
| Canned eggs, decayed | 58 pounds. |
| Bear meat, tainted | 720 " |
| Rabbit meat, tainted | 100 " |
| Lobsters, decayed | 487 " |
| Miscellaneous fish, decayed | 9,713 " |
| Miscellaneous fruits, decayed | 130 bushels. |
| Miscellaneous vegetables, decayed | 344 " |
| Miscellaneous canned goods, decayed | 4,757 cans. |

Respectfully submitted,

ALEXANDER BURR, M.D.V.,
Veterinary Medical Inspector.

REPORT OF PORT PHYSICIAN.

To the Board of Health :

GENTLEMEN,—I herewith submit the annual report of the Quarantine Department for the year ending February 1, 1906.

During the past year all vessels from foreign ports with the exception of the British Maritime Provinces have been inspected, and from June 1 to October 1 all vessels from ports south of Virginia have been inspected. Under a recent ruling of the Treasury Department all vessels from Porto Rico are classified with those coming from southern ports.

Hospital report is as follow :

| | Admitted. | Discharged. | Died. | In Hospital, Feb. 1, 1906. |
|--------------------|-----------|-------------|--------------|-------------------------------|
| Variola | 4 | 4 | ..... | ..... |
| Varicella..... | 3 | 3 | ..... | ..... |
| Measles..... | 30 | 30 | ..... | ..... |
| Leprosy..... | 3 | 3 | ..... | ..... |
| Observation..... | 36 | 36 | ..... | ..... |
| Totals..... | 76 | 76 | ..... | ..... |

| | | | | | |
|---------------------|---|---|---|---|--------|
| Vessels inspected | . | . | . | . | 811 |
| Vessels disinfected | . | . | . | . | 32 |
| Passengers examined | . | . | . | . | 80,317 |
| Seamen “ | . | . | . | . | 11,401 |
| Cattlemen “ | . | . | . | . | 3,094 |

The hospitals at Gallop's Island are in good condition. Steamers “Vigilant” and “Relief” have been overhauled and put in first-class condition.

Respectfully submitted,

PAUL CARSON,
Port Physician.

REPORT OF MILK INSPECTOR.

BUREAU OF MILK INSPECTION,
30 HUNTINGTON AVE., BOSTON, MASS.

To the Board of Health:

GENTLEMEN, — I have the honor to submit the following report for the year ending January 31, 1906:

The total number of samples collected and examined was 20,653, as follows:

| | |
|---|--------|
| Number of samples of milk from wagons | 6,873 |
| “ “ “ “ stores | 5,905 |
| “ “ “ brought in by citizens | 245 |
| “ “ “ (bacteriological) | 5,559 |
| <hr/> | |
| Total milk samples | 18,582 |
| Number of samples of vinegar | 1,404 |
| “ “ butter, cheese and oleomargarine, | 667 |
| <hr/> | |
| Total samples | 20,658 |

A large proportion of the milk offered for sale in this city during the year just closed was of standard quality, and by comparison the number of cases entered in court for violation of the milk law was slightly less than during the year ending January, 1905. Infrequently there was trouble from a shortage of supply, and the fact that milk offered for sale during these dearth periods was procured from new sources and sections more remote than those from which the milk is ordinarily obtained. During these unusual intervals, in order to supply the demand, much of the milk is taken, without examination, directly from the cars to customers. At such times more trouble is experienced than when a full supply of milk is available under usual conditions. Much of the low grade milk found in shops is depreciated in quality by the careless or intentional skimming on the part of the storekeeper or of his clerks. Such removal of cream, either with or without motive, is inexcusable, but in order to bring this subject to the attention of dealers and prevent the sale of milk skimmed in this manner a notice was prepared

and mailed to each shopkeeper urging the employment of proper mixing methods so that each customer may receive his share of cream.

The data obtained from dealers indicates that the quantity of milk arriving in this city daily by railroad amounts to 301,175 quarts; there is also brought to this city each day by wagons from farms in nearby towns 38,140 quarts; and the 593 cows in this city produce 5,533 quarts: total number of quarts per day, 345,448. Based upon these figures 87.18 per cent. of the milk is brought to this city by railroad.

There are 344 dealers licensed to sell milk from wagons, but many of these concerns use several wagons in their business; the number of shops registered for the sale of milk is 3,629.

For many years milk for the Boston market has been transported and sold in cans having a capacity of $8\frac{1}{2}$ quarts. At the present time this unit with some firms is undergoing gradual change, especially for the purchase of milk from the farmer and transportation by rail, the old-style can being replaced by those holding $21\frac{1}{2}$ quarts, or two and one-half of the $8\frac{1}{2}$ -quart cans. It is felt by those bringing about this innovation that this style of can may be returned to the farmer in a more satisfactory state than is possible with the $8\frac{1}{2}$ -quart can, also that the milk is received at the end of its journey in a better condition. These large cans are not employed about the city for the delivery of milk, but after being emptied of their contents are immediately washed and returned to the country.

The subject of unclean wagons has on several occasions presented itself forcibly and offensively. This state of affairs is usually due to the spilling of milk on the wagons, which in time, owing to natural changes, develops offensive and objectionable products. Such surroundings attending the delivery of milk are disgusting, and should have the effect of decreasing the business of every concern operating these filthy vehicles. In every instance these unsanitary features have been immediately brought to the attention of the owners of these wagons, and an immediate improvement has followed each warning.

Stores are occasionally discovered where a total lack of attention to cleanly conditions exists. These shops are for the most part in the poorer localities, the business transacted is of small volume, and the customers poor and needful of the best surroundings for the handling of their milk supply. The remedy often necessary is revocation of the right to sell milk. Ordinarily this action produces the result desired,

and after it is apparent that the lesson of enforced cleanliness is learned, a new permit to engage in the sale of milk is granted. This action usually brings about salutary results.

Consumers pay tribute to custom in countenancing a stale milk supply. This custom may have been introduced in former years by milkmen, but whatever its source it is asserted that the public desires and insists upon having a layer of cream at the top of the milk when it is delivered. While this impression is true to a certain extent, it is not wholly supported by fact, as will be noted by the practice now in vogue for the colder months of the year. To cater to this demand the milk is usually placed in bottles the day before delivery and held by the milkmen until the following morning. Thus the milk is left at houses from sixteen to twenty-four hours older than necessary. The time which elapses between the delivery of milk to families (during the early morning hours) and its being placed in the ice chest is a decided detriment to its keeping qualities, especially in summer, through increase of temperature which conduces to rapid multiplication of bacteria, and it is a condition which should be changed. During the winter months many milkmen, to avoid the inclement weather of the early morning, deliver their supply upon the day of its receipt. It thus reaches the consumer ten to twelve hours earlier than when the morning delivery is in vogue. This method has proven fairly satisfactory to consumers, even though the cream layer is less marked, and it is one which should be followed throughout the year.

As a result of the examination of samples of condensed milk a product shipped here from New York State was discovered which was preserved with formaldehyde. The dealer selling this milk obtained his supply in bulk and bottled it at his place of business in an adjoining city, later delivering it to customers. Complaint was entered in court, and after trial the defendant was convicted and fined \$100, which he paid. The method by which the preservative found its way into this milk is unknown, but the examinations of subsequent samples of the same brand proved that a way was immediately discovered of keeping it out of the supply.

The bacteriological examination of milk has been continued with such success that not only has there been an improvement in the matter of cleaner milk, but the co-operation of contractors and others has been enlisted in extending and enlarging the scope of this work. As a result of these inspections there were issued 712 warnings upon samples having an excessive number of bacteria, or containing pus, pus and streptococci, or streptococci. Of these warnings,

345 were issued to the contractors upon samples taken directly at the cars; through the contractors these warnings were forwarded to the producers. Subsequent examination of the milk of these dairies usually showed a decided change for the better in the quality of the product. The appended tables giving the result of these examinations are of interest in that they not only demonstrate the feasibility of procuring the milk of this city of such a quality that a large percentage is well within the Board of Health standard of 500,000 bacteria per cubic centimeter, but that the main difficulty with milk as it arrives here is due to a few dairies, where it is fair to assume that dirt or neglect prevail. The contractors' table (I.) shows that 87.6 per cent. conformed to the required standard, and of this number 59.8 per cent. contained under 50,000 bacteria to each cubic centimeter. Only 12.4 per cent. were in excess of the requirement.

Table I.—Bacteriological Examination of Milk Samples from Contractors. Taken from the Cars on Arrival.

| BACTERIA PER CUBIC CENTIMETER. | Number. | Per Cent. |
|----------------------------------|--------------|--------------|
| Under 50,000..... | 2,486 | 59.8 |
| 50,000 to 100,000..... | 628 | 15.1 |
| 100,000 to 200,000..... | 258 | 6.2 |
| 200,000 to 300,000..... | 111 | 2.7 |
| 300,000 to 400,000..... | 64 | 1.5 |
| 400,000 to 500,000..... | 96 | 2.3 |
| Total, under 500,000..... | 3,643 | 87.6 |
| 500,000 to 600,000..... | 61 | 1.5 |
| 600,000 to 1,000,000..... | 130 | 3.2 |
| 1,000,000 to 3,000,000..... | 181 | 4.3 |
| 3,000,000 to 5,000,000..... | 43 | 1.0 |
| 5,000,000 to 10,000,000..... | 37 | 0.8 |
| Above 10,000,000..... | 67 | 1.6 |
| Total, above 500,000..... | 519 | 12.4 |
| Total..... | 4,162 | 100.0 |

Table II. gives the result of the bacteriological examination of the milk obtained from the different contracting firms. From this the varying quality of the milk which these concerns are bringing into this city is apparent.

Table II. — Bacteriological Examination of Milk Samples from Individual Contractors. These Specimens Considered Collectively in Preceding Table.

| BACTERIA PER CUBIC CENTIMETER. | A | | B | | C | | D | | E | | F | | G | |
|-----------------------------------|---------|-----------|---------|-----------|---------|-----------|---------|-----------|---------|-----------|---------|-----------|---------|-----------|
| | Number. | Per Cent. | Number. | Per Cent. | Number. | Per Cent. | Number. | Per Cent. | Number. | Per Cent. | Number. | Per Cent. | Number. | Per Cent. |
| Under 50,000 | 120 | 57.6 | 412 | 71.0 | 341 | 59.7 | 285 | 50.8 | 408 | 61.6 | 427 | 57.7 | 483 | 57.4 |
| 50,000 to 100,000 | 41 | 19.7 | 65 | 11.3 | 101 | 17.7 | 99 | 17.0 | 98 | 14.8 | 97 | 13.1 | 127 | 16.0 |
| 100,000 to 200,000 | 10 | 4.8 | 19 | 3.3 | 37 | 6.5 | 24 | 5.9 | 55 | 8.3 | 51 | 6.9 | 52 | 6.2 |
| 200,000 to 300,000 | 4 | 2.0 | 4 | 2.4 | 15 | 2.6 | 23 | 4.1 | 15 | 2.3 | 23 | 3.2 | 27 | 3.2 |
| 300,000 to 400,000 | 7 | 3.4 | 10 | 1.7 | 6 | 1.1 | 11 | 1.9 | 10 | 1.5 | 10 | 1.4 | 10 | 1.2 |
| 400,000 to 500,000 | 8 | 3.8 | 10 | 1.7 | 16 | 2.8 | 14 | 2.4 | 15 | 2.3 | 16 | 2.2 | 17 | 2.0 |
| 500,000 to 600,000 | 5 | 2.4 | 9 | 1.5 | 10 | 1.8 | 9 | 1.6 | 10 | 1.5 | 9 | 1.2 | 9 | 1.0 |
| 600,000 to 1,000,000 | 2 | 1.0 | 12 | 2.0 | 17 | 3.0 | 19 | 3.3 | 16 | 2.4 | 31 | 4.3 | 33 | 4.0 |
| 1,000,000 to 3,000,000 | 11 | 5.3 | 18 | 3.1 | 20 | 3.5 | 40 | 6.9 | 20 | 3.0 | 41 | 5.6 | 31 | 3.7 |
| 3,000,000 to 5,000,000 ..... | ..... | ..... | 5 | 0.8 | ..... | ..... | 12 | 2.1 | 7 | 1.1 | 6 | 0.8 | 13 | 1.5 |
| 5,000,000 to 10,000,000 ..... | ..... | ..... | 4 | 0.6 | 2 | 0.4 | 6 | 1.0 | 2 | 0.3 | 13 | 1.8 | 10 | 1.2 |
| Above 10,000,000 ..... | ..... | ..... | 4 | 0.6 | 5 | 0.9 | 17 | 3.0 | 6 | 0.9 | 13 | 1.8 | 22 | 2.6 |
| Total, under 500,000 | 190 | 91.3 | 520 | 91.4 | 516 | 90.4 | 476 | 82.1 | 601 | 90.8 | 624 | 84.5 | 716 | 86.0 |
| Total, above 500,000 | 18 | 8.7 | 52 | 8.6 | 54 | 9.6 | 103 | 17.9 | 61 | 9.2 | 113 | 15.5 | 118 | 14.0 |
| Total | 208 | 100.0 | 572 | 100.0 | 570 | 100.0 | 579 | 100.0 | 662 | 100.0 | 737 | 100.0 | 834 | 100.0 |

By detecting these filthy dairies and either insisting upon an immediate change of methods or exclusion of their milk, the contractors can materially benefit the supply.

The tables for wagon and store samples are also worthy of careful study, for they demonstrate conclusively the change wrought in the milk (as disclosed by the contractors' table) by age and improper handling. Ordinarily the milk which arrives by train on the forenoon of one day is not distributed to customers, as previously noted, until the morning of the next day; meanwhile it has been poured into coolers (tanks for mixing to obtain a product of greater uniformity) and then placed in packages and stored until time for distribution to the trade. The $8\frac{1}{2}$ -quart cans in which the wagon dealer obtains the milk from the contractor are usually refilled by the former from his cooler without washing and after standing about opened during the mixing process. In hot weather the small amount of milk remaining in these emptied cans is often exposed to air and high temperature, conditions favorable to bacterial growth. The probability of subsequent contamination of the large bulk of milk when these cans are refilled is excellent. Some of the other possible contributory causes to bacterial increase, in addition to that just mentioned, and age, are exposure of milk to high temperature, the use of mixing tanks, and containers not properly cleansed; contamination by dirt and moisture from the outside of the large cans, while the latter are inverted to empty the contents into the cooler, and the manner of tasting the milk, which is deemed necessary by the trade.

The milk examined under the head of wagon samples was not as old, in most instances, as that taken from stores, and it had less atmospheric exposure. The store milk is subject to the further possibility of contamination by pouring from can to can for mixing or from the use of a tank for purposes of dipping milk as sold. The lesson derived from the following tables is that the milk distributed by wagons has a smaller number of bacteria than that found in stores, justifying the deduction that bacterial growth is favored by age and much exposed handling. Of the wagon samples (Table III.) 54.4 per cent. were within the standard, while 45.6 per cent. had an excessive number of bacteria, with only 18 per cent. under 50,000 bacteria per c.c.

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Table III. — Bacteriological Examination of Milk Samples from Wagons.

| BACTERIA PER CUBIC CENTIMETER. | Number. | Per Cent. |
|---|---------|-----------|
| Under 50,000 | 137 | 18.0 |
| 50,000 to 100,000 | 66 | 8.7 |
| 100,000 to 200,000 | 80 | 10.5 |
| 200,000 to 300,000 | 49 | 6.4 |
| 300,000 to 400,000 | 27 | 3.5 |
| 400,000 to 500,000 | 56 | 7.3 |
| Total wagon samples under 500,000 | 415 | 54.4 |
| 500,000 to 600,000 | 30 | 4.0 |
| 600,000 to 1,000,000 | 82 | 10.8 |
| 1,000,000 to 3,000,000 | 134 | 17.6 |
| 3,000,000 to 5,000,000 | 57 | 7.5 |
| 5,000,000 to 10,000,000 | 29 | 3.8 |
| Above 10,000,000 | 14 | 1.9 |
| Total wagon samples above 500,000 | 346 | 45.6 |
| Total | 761 | 100.0 |

With the older store milk (Table IV.) only 28.5 per cent. complied with the Board of Health regulation, and 71.5 per cent. were in excess. Of this latter number it will be noted that the greater portion contained over 1,000,000 bacteria. Furthermore only 4.9 per cent. were found with less than 50,000 bacteria to the cubic centimeter.

Table IV. — Bacteriological Examination of Milk Samples from Stores.

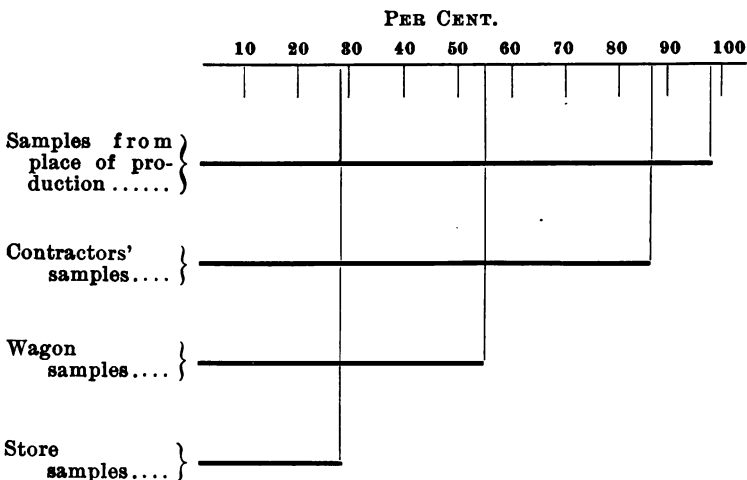
| BACTERIA PER CUBIC CENTIMETER. | Number. | Per Cent. |
|---|---------|-----------|
| Under 50,000 | 17 | 4.9 |
| 50,000 to 100,000 | 12 | 3.4 |
| 100,000 to 200,000 | 13 | 3.8 |
| 200,000 to 300,000 | 19 | 5.5 |
| 300,000 to 400,000 | 14 | 4.0 |
| 400,000 to 500,000 | 24 | 6.9 |
| Total store samples under 500,000 | 99 | 28.5 |
| 500,000 to 600,000 | 9 | 2.6 |
| 600,000 to 1,000,000 | 45 | 13.0 |
| 1,000,000 to 3,000,000 | 102 | 29.2 |
| 3,000,000 to 5,000,000 | 44 | 12.6 |
| 5,000,000 to 10,000,000 | 27 | 7.8 |
| Above 10,000,000 | 22 | 6.3 |
| Total store samples above 500,000 | 249 | 71.5 |
| Total | 348 | 100.0 |

The samples taken at place of production (Table V.) were for the most part collected shortly after milking at stables in this city where cows were kept. Of these specimens 98.5 per cent. complied with the standard, and of this number 92.3 per cent. had under 50,000 bacteria to each cubic centimeter.

Table V.—Bacteriological Examination of Milk Samples from Place of Production.

| BACTERIA PER CUBIC CENTIMETER. | Number. | Per Cent. |
|--|------------|--------------|
| Under 50,000..... | 288 | 92.3 |
| 50,000 to 100,000..... | 12 | 4.1 |
| 100,000 to 200,000..... | 4 | 1.4 |
| 400,000 to 500,000..... | 2 | 0.7 |
| Total unclassified samples under 500,000..... | 284 | 98.5 |
| 1,000,000 to 3,000,000..... | 1 | 0.4 |
| 5,000,000 to 10,000,000..... | 2 | 0.7 |
| Above 10,000,000..... | 1 | 0.4 |
| Total unclassified samples above 500,000.. | 4 | 1.5 |
| Total..... | 288 | 100.0 |

The continuous decrease in the percentage of samples which complied with the bacterial standard between the time the milk is received from the country by the contractors and its delivery from wagons, or sales from stores, is shown by the following diagram: (The samples, taken at place of production, the greater portion being fresh milk, are also given for comparison with the above.)



During the year it was deemed advisable, after repeated warnings, to institute action under this regulation, and in

all nine cases were entered in court, alleging excess of bacteria. The defendants secured able counsel and appealed the cases from the lower court. Subsequently, in the Superior Court, the fines of \$10 each, imposed by the lower courts, were paid.

A source of trouble in winter, from the bacteriological standpoint, is the endeavor of farmers to prevent their milk from freezing, the night's milk being kept at the farms, near a stove or some source of artificial heat. Some of the producers evidently use little judgment as to changeable atmospheric conditions, and, during the warmer periods of winter, to which this section of country is subject, continue this custom of bacterial incubation; in consequence of which some of this milk, on arrival in this city, has a greater number of bacteria than that of the same dairy in summer. This is a matter easily remedied by care and attention to temperature conditions.

An idea of the extensive existence of the infected milk may be gleaned from the appended table (VI.), which shows that of the 5,559 specimens subjected to bacteriological examination 583, or 10.48 per cent., show the presence of pus, or pus and streptococci, or streptococci alone. Pus and streptococci are indications that the cows from which this milk was obtained were gargety, and the large number of samples contaminated with pus and its accompanying organisms shows something of the lack of care ordinarily exercised in keeping milk from unhealthy stock from the market supply. This condition is not conducive to either the health or appetite of consumers of milk thus infected. Such milk as food can only be contemplated with disgust, even if the possible ill effects accompanying its use be eliminated. Its employment is detrimental to the public, and it should be rigidly excluded by the producer from the milk sent to market. Such has been the attitude of this Bureau in dealing with the problem. Upon ascertaining the existence of these abnormal conditions, the contractor was immediately notified not to allow the milk from this particular dairy to come to this city until it was free from the indications of disease. The contractors have rendered commendable aid, and present results indicate an improvement over former conditions. The latter months of 1905, as also January, 1906, show a decreased percentage of infected samples, and it is to be hoped the work of the future will disclose a more pronounced lessening of this objectionable contamination.

Table VI.

INFECTED MILK SAMPLES.

| MONTH. | Total samples examined. | Number containing pus. | Number containing pus and streptococci. | Number containing streptococci. | Per cent. of milk infected. |
|-----------------|-------------------------|------------------------|---|---------------------------------|-----------------------------|
| 1905. | | | | | |
| February | 556 | 27 | 14 | 44 | 15.3 |
| March | 625 | 37 | 13 | 45 | 15.2 |
| April | 502 | 23 | 4 | 34 | 12.2 |
| May | 537 | 28 | 3 | 18 | 9.1 |
| June | 671 | 54 | 5 | 37 | 14.3 |
| July | 434 | 35 | 9 | 19 | 14.5 |
| August | 261 | 17 | 3 | 17 | 14.1 |
| September | 216 | 6 | 1 | 6 | 6.0 |
| October | 411 | 19 | 1 | 5 | 6.1 |
| November | 316 | 7 | 5 | 6 | 5.6 |
| December | 428 | 7 | ..... | 2 | 2.1 |
| 1906. | | | | | |
| January | 602 | 19 | 3 | 10 | 5.3 |
| Total..... | 5,559 | 279 | 61 | 243 | |

The question is often asked: "How is the producer to know that his milk is polluted?" He can at least be observant of the health of his stock and not send to market any milk drawn from animals whose condition is not beyond conjecture; and he should also exclude from the salable milk that of cows just prior to and after the calving period. The sale of such milk is specifically prohibited by the Board of Health regulation, section 4, article 1, providing that "no milk shall be sold, offered for sale, or distributed in the city of Boston which was drawn from cows within fifteen days before or five days after parturition." This subject was also considered by the Massachusetts Cattle Owners' Association at the meeting of January 30, at Gardner, Mass., the following vote being adopted: "The milk of a healthy cow should not be used for twenty days before calving nor for three to five days afterward." At the same meeting the association also voted that "the milk of a diseased cow should not be used upon the farm or sent to market." Before and after the calving period milk is subject to pus

contamination, and many of the specimens so reported during the year, it was subsequently learned, were obtained from cows approaching or subsequent to parturition. By closer attention to this subject producers may often prevent their milk being shut out of this market. The Bureau has been handicapped in investigating these contaminated milks by inability to ascertain the exact conditions existing at the farms from which the objectionable specimens came. In certain instances, however, it has been possible to obtain the desired information, which not only demonstrated the value of and the necessity for this work, but disclosed a state of affairs which, while interesting from the scientific standpoint, did not tend to increase the desire for this article of food. The following is a summary of some of these investigations of the different dairies (referred to by numbers), the milk of which contained either (a) pus, pus and streptococci or streptococci (b).

1. Two cows with pulmonary tuberculosis; both were subsequently killed. One cow about to drop calf.
2. One cow about to calve.
3. Two gargety cows; one chronic. One five-teated cow giving milk from only two teats.
4. Cows in poor physical condition; these were immediately sold.
5. Herd subjected to tuberculin test; the cows responding being sold.
6. Cow with hard udder.
7. Cow with lumpy udder, thought to be due to calf leaving cow when the latter was in full milk.
8. Cow with inflamed udder from having been hooked by another animal.
9. One tuberculosis cow, which was killed. One cow with three teats. Subsequent to the exclusion of the milk from these cows the contractor learned that the milkmen whom he supplied had persistently refused upon the physical test of taste and smell to use this milk, but after its elimination the same dealers were buying the milk of this dairy with apparent satisfaction.
10. Two hindquarters of the udder of one cow badly congested; apparently had been in this condition for some time.
11. Two cows responded to tuberculin test; they were killed.
12. Trouble due to use of milk from a three-teated cow.
13. Two dairymen refused to have their stock examined by a veterinarian. Their milk was not afterward allowed to come to this market.

a. These findings in several instances evidently denote mixed infection.

b. In each case the objectionable milk was immediately excluded from this market.

14. Farmer reports one cow in a bad physical condition.
15. Cow with a sore on one teat; producer claimed this milk was not being sent to this city. Two cows with congested udders.
16. Gargety cow. Another cow which had recently calved.
17. Dirty barn; cows caked with dried manure. One cow with a swollen udder. Producer had not complied with requests made at the last inspection by the contractor.
18. Two cows with inflamed udders; one giving bloody milk. Cows subjected to the tuberculin test, and some which denoted a positive reaction killed.
19. Gargety cow.
20. One cow nearly dry; another fresh from calf.
21. Cow in poor physical condition.
22. "Rheumatic cow."
23. Gargety cow; general surroundings of this dairy such that none of the milk was allowed to come to this city.
24. Cow with a swollen udder.
25. Cow in poor physical condition since calving. The existing state of affairs was disgusting and apparent to observation.
26. Gargety cow.
27. One cow with a high fever. One cow giving milk from one teat by means of a milk tube.
28. Cow recently calved; another cow about to calve.
29. Gargety cow with swollen udder.
30. Cow with a section of the udder atrophied and discharging pus.
31. Cow with a blind abscess.
32. Cow with one teat obstructed; milk contains much pus.
33. Cow with a large abscess on udder.

To a large extent this information has been derived from contracting firms, and these have shown praiseworthy attention in protecting the interests of the consumer from this polluted milk by co-operating in keeping it from this city. These reports confirm the former statement that in many cases cited these findings could have been avoided by the producer through the exercise of ordinary care in observing the physical condition and surroundings of his stock and less to the quantity of milk shipped to market.

The importance of low temperature to the milk supply in lessening bacterial growth cannot be overestimated, and although the maximum temperature permissible under the Board of Health regulation is 50° Fahrenheit, a still lower temperature is more conducive to the best results. The standard selected by the Board of Health literally means cold milk, and the colder the better. This subject of low temperature is one calling for conscientious application and liberal interpretation. Confining the actual working of the

regulation to the borders of this city, while to a degree beneficial, would at the same time fail to bring about that which is desired and intended. To conform to the intent and at the same time achieve the full measure of benefit, milk should be cooled immediately at the farms after being drawn from the cow, and maintained constantly at a low temperature until it reaches the consumer. Furthermore, it is a mistaken idea with some producers to confine the use of ice to the warmer months of the year, as experience has demonstrated that during the high temperature periods of the spring, fall and winter, milk which has not been sufficiently cooled at the farm often arrives in this city in a worse condition than during the summer months when more effort is usually made to have it cold. Milk should always be cooled as soon as it leaves the cow, and the cooling should not be governed by any other rule or restricted to a particular time of year. It is obvious that this also calls for a liberal use of ice, both during the transit and storage of milk. An earnest movement is already under way to bring about this state of affairs, one which should have the support of every raiser and dealer in milk. Although this means to both expense and trouble, there will be at the same time a gain from lessening the amount and consequent loss resulting from sour milk, and the accompanying satisfaction of giving the consumer a better product. Much then, but not all, depends upon the farmer, not only in cooling the milk, but in absolute cleanliness, for he is responsible for its condition during the crucial period. Unless the milk leaves the farm *cold* and *clean*, it is impossible to subsequently repair the damage of omission and commission at the fountain head.

A low temperature is an essential, but not the sole factor for a good milk supply. Cleanliness is likewise of importance, and the production of milk free from dirt calls for much labor and constant watchfulness. This includes care as to the cleanliness of the cow at all times, and more especially prior to and at the milking hour; attention to her surroundings, such as providing ample and clean quarters, and a bountiful supply of light and ventilation, neatness on the part of the milkers, as well as the proper cleansing of all of the utensils used in handling of milk.

A large number of warnings were issued to dealers for lack of proper attention to the icing of their milk, and in most instances of subsequent examinations more care in cooling the milk was noted. Occasionally, however, it was found that court proceedings were necessary to achieve the desired end, and in all ten such actions were brought.

The contracting firms are alive to the importance of a better milk supply, and the bacteriological work undertaken by this Bureau in 1904 has been the direct cause of five concerns establishing their own laboratories where examinations could be made of their milk supplies. This work is to be commended, and it cannot fail to be an important adjunct in bringing about better conditions. These companies report having made thousands of examinations between February 1, 1905, and February 1, 1906. Such examinations are made upon samples either secured at the receiving stations in the country or as the milk arrives in this city. Whenever the results indicate unclean or abnormal conditions the farmer is notified of the result, and warned to make a change in methods. These warnings are followed by later examinations, and unless improvement is noted the dairy is rejected. It is usually found by those firms pursuing the above course that these warnings and the accompanying helpful suggestions are followed by good results.

The contractors are making efforts to arouse producers to the importance of this subject, to the end that the latter use more care as to the health of their stock and observance of the sanitary conditions under which milk is produced and handled. These endeavors are campaigns of enlightenment, and in detail include inspection of dairies, either personal or by paid agents. One concern makes these visits at least twice a year, and oftener where necessary to accomplish desired improvement. These inspecting trips of the contractors are supplemented by the issuance, from time to time, of literature disseminating useful information as to the housing of cattle and to the proper ventilation of stables, the necessity of abundant light and proper sanitary conditions, the desirability of cleanliness with cows, as well as the evil results from having a person with slovenly habits about a dairy, the liability of milk absorbing odors and prevention of such occurrences, reasons for the souring of milk, with directions for its proper cooling and lessening of the dirt content, the proper cleansing of utensils employed in handling milk; recommending generous supplies of ice, with plans for its proper storage; taking the temperature of the milk as delivered at the receiving stations by farmers, and issuing warnings to farmers who persist in sending milk insufficiently cooled; demanding that proper attention be given to the health of the stock, and that milk from unhealthy cattle be kept from the market supply, and inserting a clause into the contract with the farmer that the milk is to be of a standard required by the Boston Board of Health, and to

be cooled to a temperature of 50° Fahrenheit or lower within an hour of milking.

Not all of these firms have taken the steps above outlined, but all of them have done something toward bettering former conditions surrounding the production and sale of milk.

Three of the contracting companies have recently notified their producers that after April 1, 1906, no milk will be received from farms not supplied with ice. Formerly all of the cleansing of cans used in conveying milk to this market was done in the country, the empty cans being returned to the farmer, and the latter was fortunate when it was only necessary for him to remove sour milk from them, as they were often retained at this end of the route until the milk drainings remaining in the cans were in a putrid condition, and not infrequently the cans were employed as temporary containers of other substances than rightfully belonged in them. In any event the cleansing of these cans was tedious and annoying to the producer, and not many farms were properly equipped for the work. At the present time some of the contractors are cleansing a portion of the cans before they are returned to the farmer, and it is their intention to increase the number so washed, as soon as arrangements for bringing about this condition can be completed.

But while a large share of the responsibility for the proper care of milk devolves upon the farmer and milkman, the householder also has important obligations to assume in this direction, in order that the efforts of the two former may not be nullified. Neglect or carelessness on the part of the householder will quickly undo, and with special rapidity in warm weather, the benefits accruing from the procuring of milk under the most modern sanitary conditions. For the housekeeper, temperature should first be considered, as milk cannot be properly kept without ice, and the lowest possible temperature is preferable. Milk, under present methods of delivery in the summer, is usually left upon door steps at an early hour and there allowed to remain until breakfast time. During the interval from the leaving of the milk by the milkman and the serving of this meal, many hours may have elapsed, and in warm weather, even if the milk was of proper temperature when delivered, the conditions are right for a marked change in temperature, consequently it is of the greatest importance that it should be iced as soon after delivery as possible and that it be kept covered while in the refrigerator, especially if the latter is used for other food products.

Although it may be repugnant to the æsthetic sense, it is

preferable to serve milk and cream at the table from the container in which it is delivered. This obviates the common practice of pouring back into the bottle or can any unused portion of milk, lessens the exposure to air, and the consequences of pouring the milk into a pitcher or other vessel not properly cleansed. The custom of leaving milk uncovered about the house exposed to the air of rooms is equally condemnable. Milk should not be thus exposed for a greater interval than is required for obtaining a supply for immediate use. Utensils used for milk are preferably cleansed by boiling water, and then turned mouth downward in a clean place and allowed to drain.

By a careful observance of these suggestions disappointments may be obviated, the quality of the householder's milk supply enhanced, and some of the unnecessary blame now attributed to milk dealers avoided.

There is a growing tendency among butter dealers to conform more closely to the law regulating the sale of renovated butter in marked papers. The wrapping paper or bags used are commonly marked by the aid of rubber stamps, and these may occasionally have — even with the best of intentions — less than the desired amount of legibility. Caution should be exercised in this particular respect by those who sell this butter.

The use of boron compounds, borax and boric acid, as preservatives of renovated butter has nearly ceased. As a matter of fact more specimens of creamery butter were found to contain the above substance during the past year than the renovated variety. Complaints were entered against the various offenders and fines were imposed in each case. In one instance the agent for a creamery in an adjoining State paid fines amounting to \$200. During the year wholesale and commission dealers in butter in this city issued a circular letter to the large makers of butter throughout the country, notifying the latter of the nature of the law of this State governing the subject. The result of the enforcement of this law and this notification has been that practically butters of all grades are coming to this market free from boron compounds.

Several samples of butter were secured early in the year which appeared to contain more than the usual amount of water. The moisture was determined in these specimens and was found to be excessive, ranging from 22.57 per cent. to 33.10 per cent. These butters were all churned by the storekeepers who made the sales. Warning notices issued to the dealers were found to be efficient in bringing the amount of moisture within normal limits.

At present there are eleven dealers licensed to sell oleomargarine in this city, and while this number is small, it is the largest registered in a similar period for several years. These places are handling uncolored oleomargarine. In most instances those dealing in this product have closely observed the legal regulations.

An effectual effort was made during the year to stamp out the sale of cider vinegar containing added coloring matter. At first this idea met with opposition on the part of vinegar dealers on the plea that the presence of these substances could not be detected. This belief, however, was shown to be erroneous, with the result that these artificially colored goods are being driven from the market. Attention is now being devoted to that class of vinegar to which color is added, and bearing fanciful designations such as "standard," "brown," or "red" vinegar. These are white wine vinegars usually colored with caramel, but occasionally mixtures of coal-tar dyes are employed.* This colored vinegar has the appearance of cider vinegar, which it is designed to imitate, and for which it is often sold. The sale of this colored vinegar, either under the above trade designation or fraudulently for cider vinegar, is expressly prohibited by statute. Vinegars of any type must be free from artificial coloring matter.

Many of the vinegar prosecutions for the year were for the sale of this colored white vinegar as cider vinegar; other vinegar cases were for the sale of cider vinegar lacking the requisite acidity or residue, or of other kinds of vinegar for low acid strength.

The following is a summary of the prosecutions made during the year:

| | |
|--|-----|
| For sale, or possession or custody with intent to sell, of milk not of good standard quality | 247 |
| For sale of milk containing annatto coloring matter | 4 |
| For possession of skimmed milk in cans not properly marked | 1 |
| For sale of milk, not being licensed | 14 |
| For sale of milk containing more than 500,000 bacteria per cubic centimeter | 9 |
| For sale of milk having a temperature higher than fifty degrees Fahrenheit | 10 |
| <i>Carried forward</i> | 285 |

*One of these coal-tar dye compounds bears the fanciful designation "Carmelle or Sugar Coloring," and it is claimed to be "ten times stronger than burnt sugar." Des. its name it contains no caramel. It is a mixture of coal-tar colors. So, too, is "Klenzlerol," another compound employed for coloring vinegar. Experiments showed that the presence of these mixtures in vinegar can be readily detected.

| | |
|--|-------|
| <i>Brought forward</i> | 285 |
| For sale of condensed milk containing formaldehyde | 2 |
| “ “ of adulterated cider vinegar | 14 |
| “ “ of adulterated vinegar | 2 |
| “ “ of vinegar not made from cider as cider vinegar, | 23 |
| “ “ of adulterated butter | 14 |
| “ “ of renovated butter not properly marked | 33 |
| “ “ of oleomargarine not properly marked | 2 |
| “ “ of oleomargarine, not being licensed | 4 |
| “ “ of cheese containing borax | 1 |
| | <hr/> |
| | 380 |
| | <hr/> |

The results of prosecutions were as follows :

| | |
|---|-------|
| Number of warrants returned without service | 2 |
| “ of cases in which defendants ran away | 3 |
| “ of cases on file | 15 |
| “ of cases dismissed on motion of complainant | 6 |
| “ of cases <i>not pros'd</i> | 1 |
| “ of acquittals | 3 |
| “ of convictions | 350 |
| | <hr/> |
| | 380 |
| | <hr/> |

| | |
|--|------------|
| The amount paid in fines was | \$5,644 00 |
| Receipts from license fees | 1,030 50 |
| | <hr/> |
| Total | \$6,674 50 |
| | <hr/> |

Respectfully submitted,

JAMES O. JORDAN,

Inspector.

